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Volume 61
Number 23

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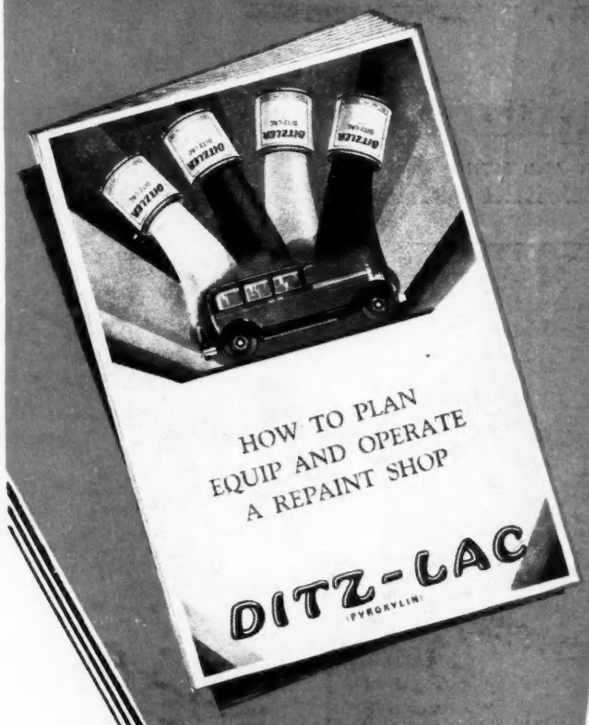

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Vol. 61 No. 23

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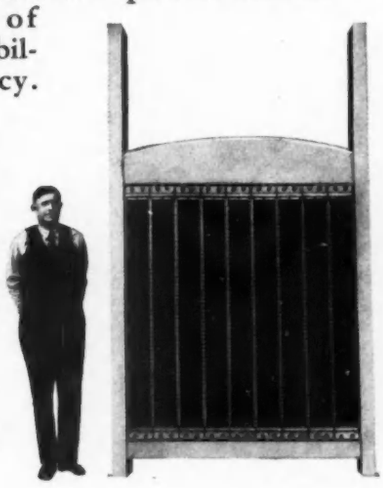

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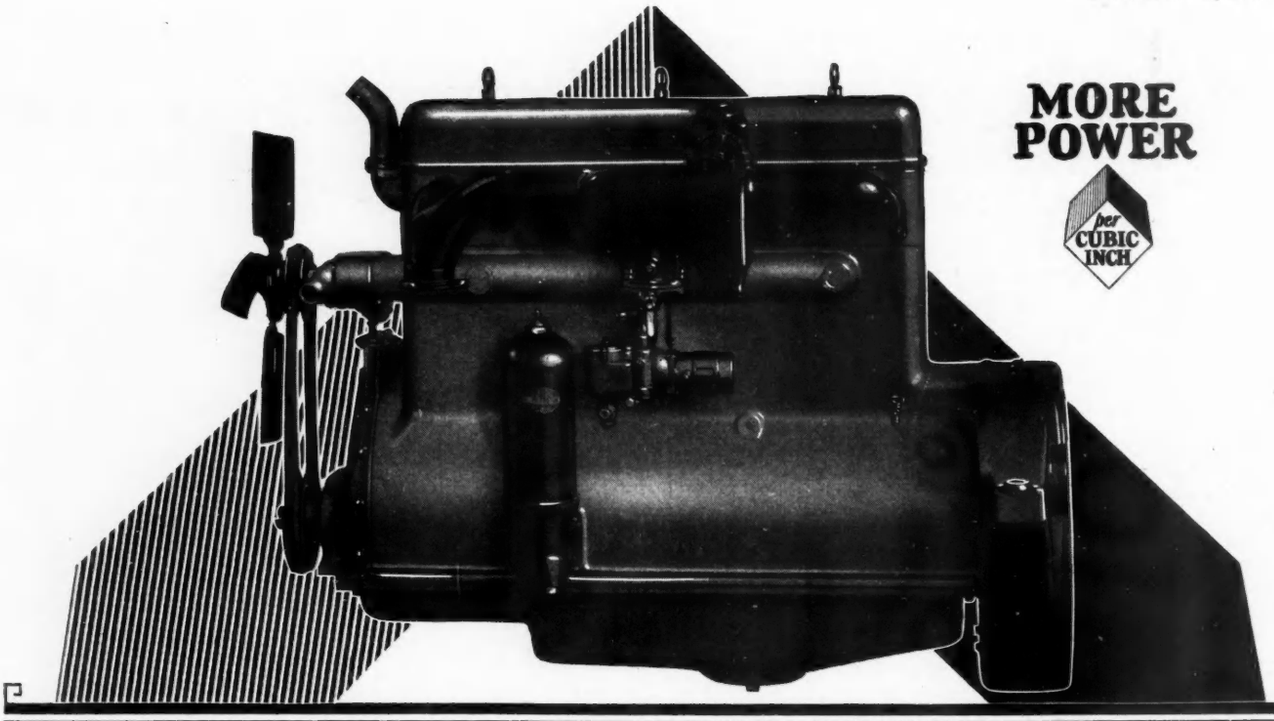

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VOLUME 61 *Philadelphia, Saturday, December 7, 1929* NUMBER 23

Automobile Stocks Lead Recovery After *Market Crash*

Rebound shows motors are backed by public confidence after average of 20 stocks drops below average levels of industrials.

By LESLIE PEAT

THE average price of automobile common stocks has shown a remarkable recovery in market values from the recent low levels for the year, when they dropped below the 1929 average low of 20 automotive accessory and parts stocks and the average low of a group of 20 standard selected industrial issues. This was found in analyzing the fluctuations of the 1929 stock market and the curves established by the drop from the high points during the summer, the recent crash, and the recovery to date. Only common stock issues are considered in this study as being the most accurate index of the public's opinion as to the soundness of securities. Weighted averages were not used, because General Motors dominates any such average because of the tremendous volume of its listed stocks as compared with other automobile issues in this analysis.

Taking the 20 automobile issues which were active on the New York Stock Exchange, including several truck stocks, comparisons were made with the 20 more important accessory, body and parts manufacturers' stocks and the 20 industrials, which have been used by statisticians as the key to industrial stock fluctuations. It developed that the average high in 1929 for the automobile group was 86¾, about 20 points higher than the 1928 high. The average high for automotive accessories and parts stocks was 77¾, nearly 25 per cent higher than the 1928 highs, and the industrials averaged 159½ at the 1929 peak, nearly 30 per cent over the 1928 average high for the same stocks.

The lows established when the bottom fell out of the market showed that automobile stocks averaged 24¾, automotive accessory and parts tumbled to an average of 26⅞, and the industrials averaged 77½.

The recovery was led by the industrial group for only about a week, beginning Nov. 18, when automobiles took the lead in the rebound, and the 20 issues, on Dec. 2, showed better than a 38 per cent recovery, while accessory and parts stocks gained on an average of 11 per cent, and the industrial group showed a 26.5 per cent rebound from the low levels of the gloomy days of Nov. 9, 11 and 13.

Because the most novel feature in the entire situation was the volume of trading done by amateurs

STOCK AVERAGES FOR 1929

	Average Price at High	Average Price at Low	Average Yield at High	Average Yield at Low	Recovery as of Dec. 2
20 Automobile Stocks	86¾	24¾	3.4%	12.5%	38%
20 Automotive Stocks	77¾	26⅞	3.5%	11.7%	11%
20 Industrial Stocks	159½	77½	3.3%	12.2%	26½%

who knew little about the elements of the stock market, the recovery would seem to indicate the trend of mind of the public rather than reflecting the opinions of an operating group, such as was the case during the panics of a decade or two ago, when the bankers' groups, railroad groups and other well-defined groups turned the tide to suit their plans. This recovery, therefore, has been largely the doing of the thousands of buyers who sought out bargains—and the consensus has been that motors are sound. They have brought motors back at a rate almost 40 per cent faster than industrials. Immediate buying orders brought several automobile stocks up as much as 6 points during the first day's trading after the collapse of the market in November.

Automobiles Show Highest Yield

Although actual earnings to date of the three groups of 20 stocks each cannot be determined because several had not made their third quarter reports as this article was written, the six months' range showed that the automobile companies selected for this analysis yielded a higher percentage on the market prices of the stocks as of Jan. 1, and as of June 1, than did the accessory group or the industrial group. The estimated average net yield of the automobile stocks at the extreme lows during the middle of November was 12.5 per cent, the highest of the three groups. The industrials were yielding at an estimated average of about 0.25 per cent under this at the low levels, and the accessories and parts group was yielding about 11.7 on the investment on the average.

It is improbable that the buying public, which looked upon automobile stocks as such bargains immediately following the panic, did so because of any marshalling and analysis of figures. The spontaneity of their purchases indicates that they had tremendous confidence in the automobile business as a whole. The automotive industry took the palm for performance from long-established industries in this recovery, indicating that the business of making automobiles, accessories and parts has captivated the public's imagination as did the operation of railroads and the leading industrials before and at the turn of the century. Many old-line industrials have "gone begging" to some extent at prices which would have brought very remunerative returns, while automobiles, accessory, radio and airplane stocks have commanded prices which allow smaller returns on money invested. The stock-buying public has apparently made up its heterogeneous mind that the automotive industry is substantially a part of America's future, and when "buying the future" they will buy a substantial automotive stock.

A sidelight on this tendency is found in the fact that tremendous financing has been done by aeroplane manufacturing, parts and operating companies this year. The public, according to one of the most eminent operating executives in the country, has been "extremely confident and has backed that confidence with unprecedented capital." Figures were not available to bring this phase of the stock market into this study, but several companies have reported excellent results in initial and refinancing operations.

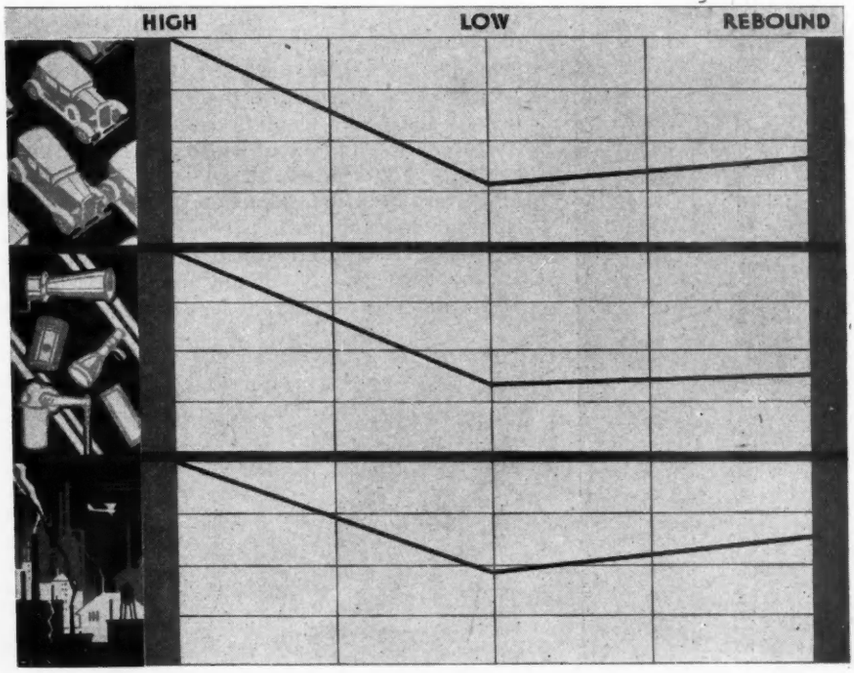
Market values of the 20 automobile stocks at the 1929 high levels totaled approximately $6,382,000,000, and the accessory and parts group reached $1,679,000,000 at the same time. The low levels brought the total market value of automobile stock down two-thirds, and the accessory group lost about 75 per cent of their values, as compared with the market values total at the highs for 1929. Industrials, which reached about $18,000,000,000 in market value totals for the 20 stocks of this analysis, declined to a point less than one-half of their former valuations when these issues reached the lows for the year.

An analysis of the market values as compared with the total assets of these three groups discloses that the total market value per share of the 20 accessory and parts stocks dropped *below* the total asset value per

Automobile Stocks

	No. of Shares Listed	High 1929	Yield at High in %	Low 1929	Yield at Low in %
Auburn	169,677	514	0.76	120	2.0
Brockway	219,081	73⅞	...	14	...
Chrysler	4,469,134	135	4.1	26	11.1
Gardner	30,000	25	...	3¾	...
Gen. Motors	43,500,000	91¾	3.9	33½	9.4
Hudson	1,596,660	93½	5.3	38	13.1
Hupmobile	1,434,452	82	2.4	18	11.1
Jordan	396,595	16½	...	1½	...
Mack	713,433	114¾	5.1	55⅛	10.9
Marmon	260,000	104	3.7	19	21.0
Moon	100,000	5	...	1½	...
Nash	2,730,000	118⅞	5.0	40	15.0
Packard	15,000,000	32½	3.3	13	9.0
Peerless	268,589	22½	...	5⅛	...
Pierce-Arrow	170,149	37⅞	...	18	...
Reo	2,000,000	31⅞	4.3	11½	8.2
Studebaker	1,941,131	98	7.1	38¼	18.4
White	800,000	53½	3.7	27¼	7.4
Willys-Ov.	2,999,882	35	3.4	5¼	24.0
Yellow T. & C.	1,300,000	51½	...	7½	...
Averages	.....	86¾	3.4	24¾	12.5

Average Market Prices



share of these companies, as of Dec. 31, 1928. Market prices, even at lows, usually stand well above the total assets of the companies, and the automobile issues and the industrial group performed in this regard, as was expected.

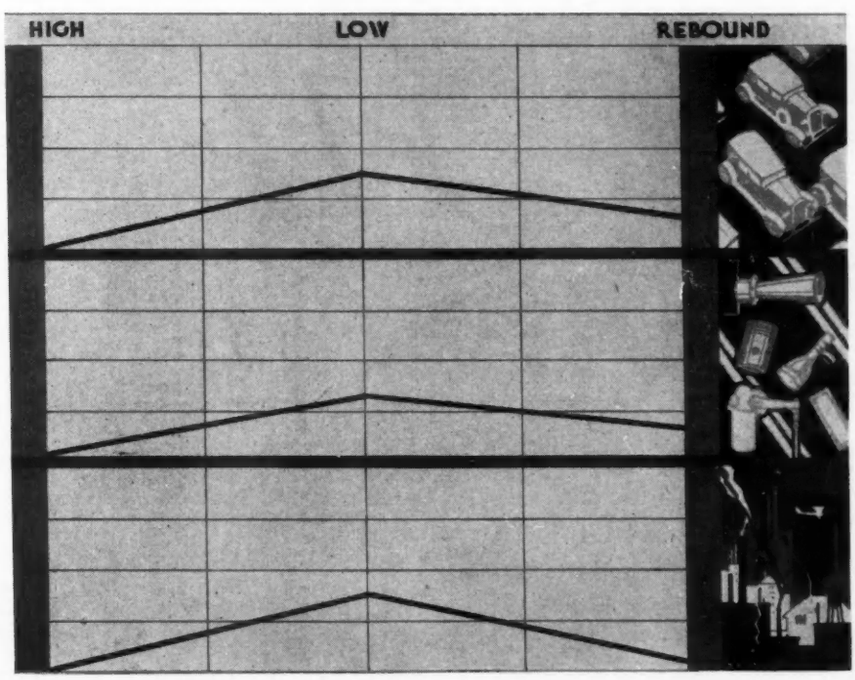
The 20 automobiles companies whose stocks showed a total market value of more than $6,000,000,000 at high had total assets of $1,367,000,000 as of Dec. 31 of last year. The total market value for these stocks at low, about $2,175,000,000, was approximately $808,000,000 over the total asset figure.

It would seem that automotive accessory and parts stocks, at their lowest levels, were the soundest buys from the standpoint of asset values, but the market called for automobile stocks to a far greater degree than it did for the accessories issues, although the difference of the yield at the low level was less than 1 per cent.

Accessories and Parts Stocks

	No. of Shares Listed	High 1929	Yield at High in %	Low 1929	Yield at Low in %
Amer.-LaFr.	609,300	87⅞	..	21½	..
Bendix	2,096,353	104⅜	1.8	25	7.2
Bohn Al. & Br.	350,947	136¾	3.6	37	13.5
Borg-Warner	1,230,620	80⅞	5.0	26	15.3
Briggs Mfg.	2,003,225	63⅛	..	8½	..
Budd, E. G.	1,031,352	22⅞	5.4	9	13.8
Campbell W. & C.	348,000	49½	4.0	20	10.0
Cont. Motors	2,112,143	28⅜	2.7	6½	13.3
Elec. Auto-Lite	925,621	174	3.5	50	12.0
Elec. Stor. Btty.	897,283	104½	4.7	55	9.9
Hayes Body	316,970	68⅜	..	5½	..
Houde-Hershey	536,898	52¾	2.8	13	11.5
Indian Motocycle	100,000	32½	..	3½	..
Kelsey-Hayes	665,755	39¾	5.0	18⅝	10.5
Motor Wheel	825,000	55⅛	5.5	21	14.3
Murray Corp.	793,206	100⅞	3.0	14⅞	20.0
Raybestos	674,757	58½	4.4	28	9.3
Reynolds Spg.	495,220	12¼	..	3⅝	..
Stewart-Warner	1,248,428	201½	0.2	30	11.1
Timken Roll. Bear.	2,407,824	139⅜	2.1	58½	5.0
Averages	.....	77¾	3.5	26⅞	11.7

Average Yield Per Share



It may be that this factor is not considered any more than is the yield in the present market.

All automobile stocks showed a remarkable earnings capacity at the lows. Hudson, for instance, is expected to show earnings of about $9 this year, and it pays $5 in dividends. It sold at 38 at the lowest point of the depression. Chrysler, with prospective earnings of $6 and dividends of $3, sold at 26 at low. Although not included in this study, Rolls-Royce preferred, which will probably earn $16 this year, sold at 21. Houdaille-Hershey, in the accessory group of 20 stocks, sold at 13 in the face of a dividend of $1.50 and prospective earnings of $5 net per share.

Bull Market is Expected

There is ample historical evidence that the common stock valuations will again rise on the crest of a bull market. In November, 1919, the world's most disastrous deflation occurred in the securities trading of this country and foreign bourses. Between February and April, 1920, the stock market had recovered 51 per cent of its loss, and many issues reached new highs for all time. In the smaller bear raid of 1907 the first recovery—a consistent rally—came to a temporary close when stocks had recovered 44 per cent. The more disastrous bear market the same year saw a recovery within a few months of about 47 per cent in market prices of stocks. It would seem logical that stocks will do in the next few months what they have done in the past under similar circumstances.

With the established public confidence in the automobile and the automotive accessory and parts business, this general rise in the market values of securities will in all probability be particularly propitious as far as automotive common stocks are concerned. The breakdown of overmargined accounts, the loss of confidence during the precipitous drop of prices and the recovery up to Dec. 2 are history, but a history which has thoroughly demonstrated that automotive industries are today considered sound by the American public.

The major deflation has furnished a laboratory for the study of automobile stocks. With the industry producing at a record rate in the face of an economic adjustment and at the close of a period when automobiles were generally believed to be luxuries, and the opening of the present era when almost everyone considers the automobile an indispensable necessity, this tremendous volume of trading on the part of the public generally has produced factual data and reactions which will mark this year as an important landmark in economics, especially as far as the automobile business is concerned. As this issue went to press, automobile stocks were still holding their own in spite of profit-taking, in spite of the stunning blow that the stock market received last month and in spite of the influence of the diminishing group who believe automobiles to be a luxury, evidence to the contrary notwithstanding.

Sales for "tax losses" have not had ther inning as yet, but tax loss sales must be covered later, so that the present condition of securities should be enhanced.

Progress Made in Development at Home *and Abroad*

E. R. Hailer, Mercedes-Benz engineer, who attended the Pennsylvania Section, S.A.E. meeting

Pennsylvania Section hears E. C. numerous manufacturers. Fuel aircraft Diesel similar to

By JOSEPH GESCHELIN

"HIGH Speed Oil Engine Development" was the subject of the paper read by E. C. Magdeburger, Aide on Diesel Engines, U. S. Navy Department, Washington, before a recent joint session of the Pennsylvania Section, S.A.E., and the Engineers Club of Philadelphia.

Mr. Magdeburger said that the Maybach four-cycle oil engine was perhaps the first high-speed type of gasoline engine in which oil was burned. Since its introduction in 1923 it has been built in one size only, developing a maximum of 150 hp. at 1300 r.p.m., with a fuel consumption of 0.40-0.49 lb. p. hp.-hr. This engine (Fig. 1) has many interesting mechanical features, such as roller bearings on the seven main journals and the crankpins, and air intake through the crankcase, for deadening the intake noise and for ventilation of the crankcase; but fuel injection by means of high-pressure air, compressed in a separate three-crank, three-stage air compressor, has been retained from the conventional type of Diesel engine. A compression pressure of 550 lb. per sq. in. has been adopted, while for injection an air pressure of up to 1500 lb. per sq. in. and for starting air pressure of 800 lb. per sq. in. are required, both supplied by the air compressor.

The fuel valves have a constant lift, but unique means have been developed for automatically changing the cross section of the nozzle in accordance with the load, and a pressure regulator is provided which regulates the injection air pressure to suit the engine speed. This makes the engine capable of operating under widely varying conditions of torque and speed and adapts it to remote control or bridge control. Disagreeable vibration of the engine is guarded against by close attention to the balancing of all rotating and reciprocating parts, and by the use of a torsional vibration damper at the forward end of the crankshaft. The fuel pump is of unique design and comprises a number of vertical plungers pressed by springs against a wobble plate, driven by a vertical shaft. Change of the inclination of the plate changes the effective stroke of the plungers.

A large number of these engines are said to have been installed in railcars operating on German, Danish, Swedish and Hungarian railroad systems, where such rigid schedules as 18 hours out of every 24 are being maintained.

An even older attempt to use heavy oil in high-speed engines must be credited to Hindlmeyer, one of the original collaborators of Diesel, who built a number of motorboat engines in Austria during the war. His

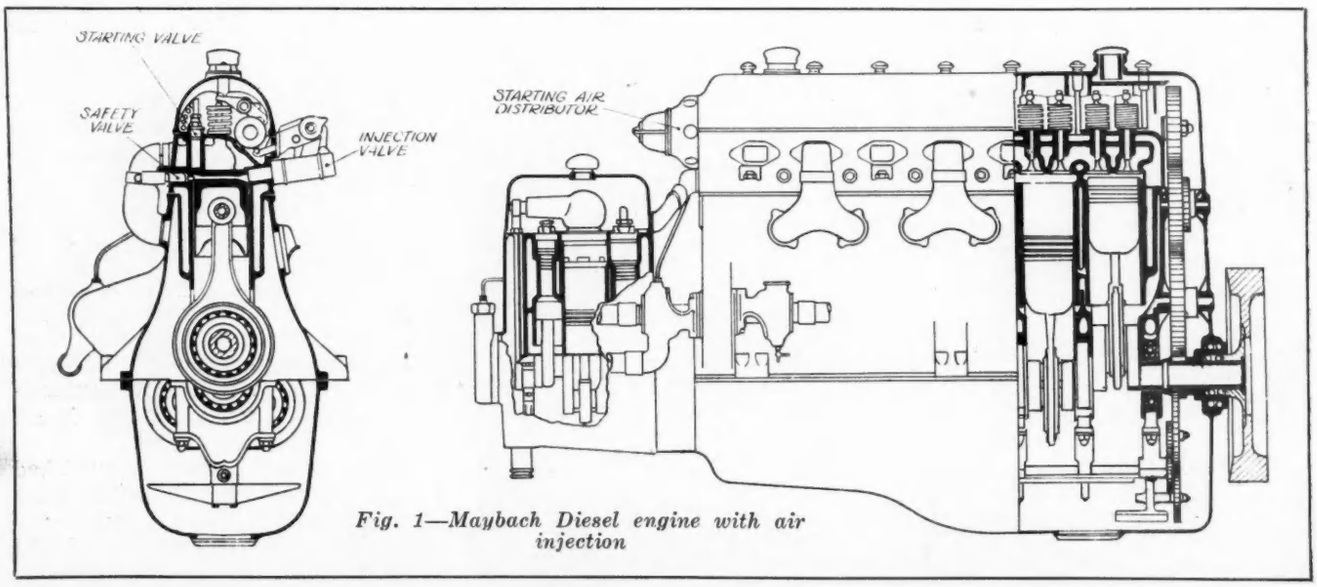


Fig. 1—Maybach Diesel engine with air injection

# of High Speed *Oil Engines Discussed* by S. A. E.

Magdeburger describe practice of injection method of Packard British Beardmore design.

and P. M. HELDT

E. C. Magdeburger, U. S. Navy Dept., whose paper on Diesel engines was the feature of the meeting of the Pennsylvania Section, S.A.E.

system of fuel injection by means of hot, high-pressure air has been applied to a two-cycle engine developed by Norman McCarty for the Climax Engineering Co. of Clinton, Iowa. The essential features of this engine are shown in cross section in Fig. 2. A small amount of air at 215 lb. pressure is delivered by an independent air compressor to the suction line *A* of the engine injection-air compressor, of which there is one for each working cylinder, driven from the common camshaft of the engine. Here the air is compressed to a pressure of about 1100 lb. per sq. in. and, in highly heated condition, forced through the fuel valve and into the cylinder, the pressure rising up to about 1300 lb. per. sq. in. at the end of injection. A fuel consumption of 0.47 lb. per b.hp.-hr. is claimed for this engine. A special feature of this engine is the mechanically operated rotary valve *F* controlling scavenging and supercharging of the working cylinder. It will be noted that the scavenging ports *I* remain open after the piston on the upward stroke has closed the exhaust ports *G* and supercharging of the cylinder up to the scavenging receiver pressure becomes possible. Furthermore, valve control of scavenging permits the adaptation of time available for scavenging to the speed of the engine, so that no useless waste of air need occur at low speeds when the time the ports remain open is longer and more air would flow through them and out into the exhaust until the compression pressure might become too low for reliable ignition. Whether the use of a stepped piston for furnishing scavenging air contributes to the reliability of the engine is a debatable question, Mr. Magdeburger stated. Suffice it to say that it was abandoned by a number of engine builders, and the experience of some early submarine engines using this contruction has been unsatisfactory.

The most obvious means of saving weight and space is, of course, the doing away with the injection air compressor, and to this end much experimental work was devoted ever since 1910, when McKechnie of Vickers, Ltd., took it up seriously. Two distinct types of injection have been developed (*a*), fluid injection, which relies upon the pressure of the oil issuing from the injection valve for atomization and penetration, while using other means to promote turbulence of the air charge and efficient combustion, and (*b*) gas injection which depends upon gases of partial combustion in a precombustion chamber for atomization and penetration of the main fuel charge, and may or may not use other means to create turbulence of the air charge.

The fluid injection in turn can be subdivided into two

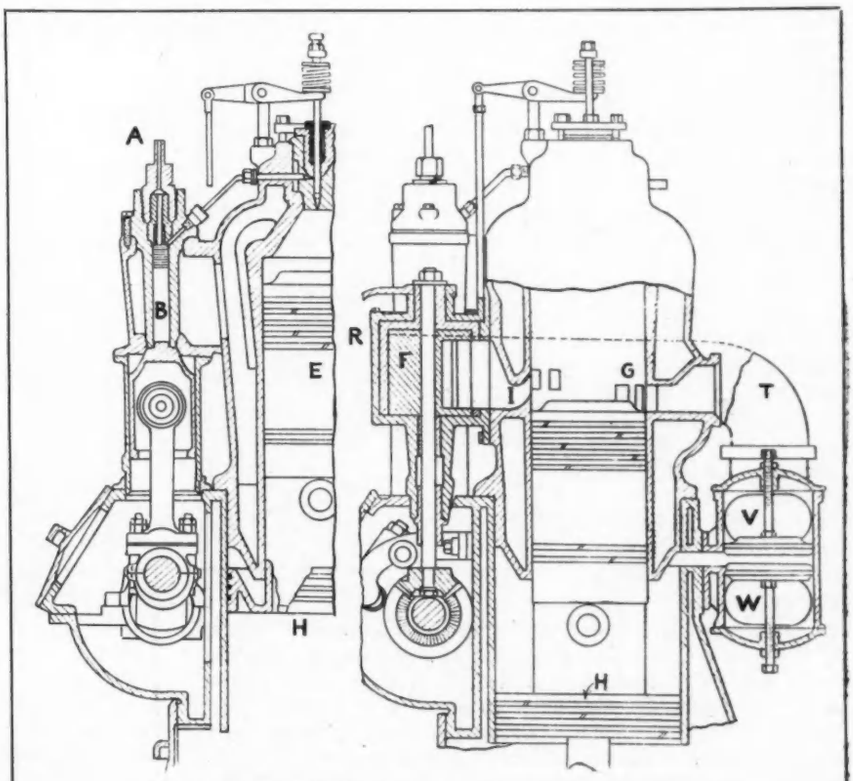


Fig. 2—Climax-McCarty two-stroke Diesel engine

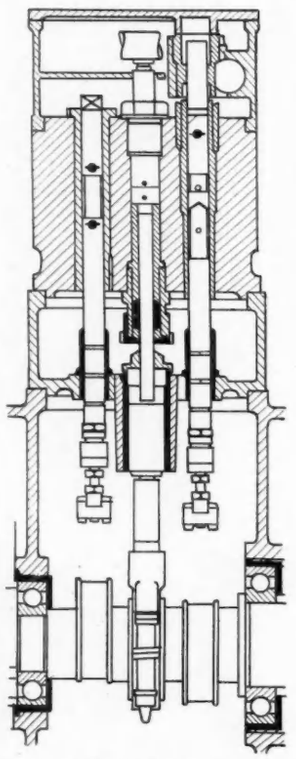


Fig. 3—Westinghouse fuel pump in section

through a spring loaded needle valve on the cylinder or through an open passage leading into the cylinder. Each of these methods has, of course, its advantages and disadvantages and therefore its partisans. Disadvantages of the various methods, as viewed by their respective competitors, are as follows:

Constant pressure fluid injection has the following disadvantages: (*a*) with fuel under constant high pressure in the manifold, the slightest leak in the injection valve will cause dripping, which will cause a smoky exhaust, deposit coke on the piston and gum up the piston rings; (*b*) metering minute quantities of fuel by keeping the injection valve open for a definite length of time is hardly reliable, since it fails to account for changes in the orifice of the valve due to erosion and clogging; (*c*) the injection control by the lift of the valve is extremely sensitive, hence continuous changing of the adjustment of individual cylinders, becomes necessary.

The direct pump system employs a pump to do all the different methods, namely: (*a*) constant pressure fluid injection, which depends upon fuel maintained under constant pressure of 2000 to 8000 lb. per sq. in., in a manifold, from which the individual cylinders receive their charges by means of mechanically operated needle valves, the latter doing the metering of the charges, and (*b*) variable pressure or direct pump fluid injection, where the pump does both the metering and the injection, either metering and changing of the timing of the fuel injection. The metered charge passes at the proper time through the discharge valve of the fuel pump and in many cases directly into the cylinders of the engine or through a spring-loaded check valve on the cylinder. Among the troubles to guard against are: (*a*) after-dripping due to secondary discharge from pressure waves and air pockets in the line, or sluggishness of valve seating; (*b*) misfiring due to the presence of air in fuel; (*c*) variation of injection lag from compressibility of oil and breathing of the pipes leading from fuel pump to cylinder.

The precombustion chamber injection consists essentially of a chamber, cup or cavity connected by a number of small holes or one large one with the combustion space in the cylinder, and into this chamber the fuel is injected by a pump through a spring-loaded needle valve. The gases resulting from combustion of a small part of the charge supply the necessary energy for atomizing and distributing the bulk of the fuel charge through the main combustion space in the cylinder.

Mr. Magdeburger also gave brief descriptions of numerous foreign engines employing direct fuel pump injection, including the M.A.N. and the Beardmore, which latter is being manufactured in this country by the Westinghouse Electric & Manufacturing Co. The latter company now has on order seven 300 hp. engines for railcars and one 450 hp. engine for a locomotive for the Canadian National Railways.

The important changes in the original Beardmore design made by the Westinghouse Co. include the reduction in the number of operating plungers of the fuel pump from nine to six in a six-cylinder engine. This was done by running the fuel pump at one-half engine speed and eliminating the distributor valve. Thus, each power cylinder is now provided

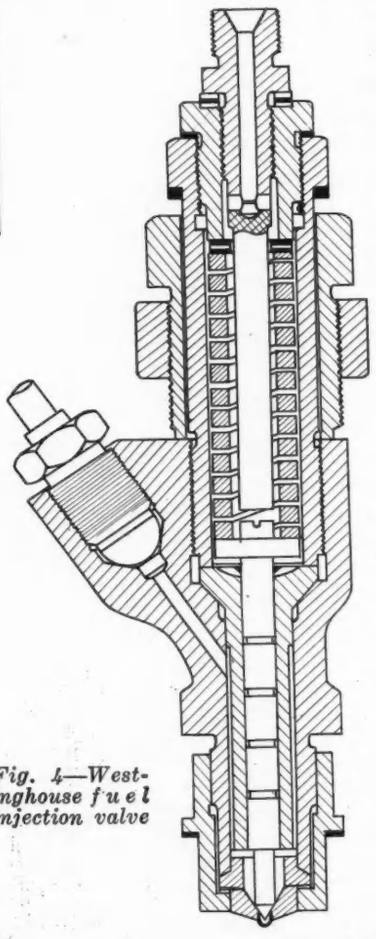


Fig. 4—Westinghouse fuel injection valve

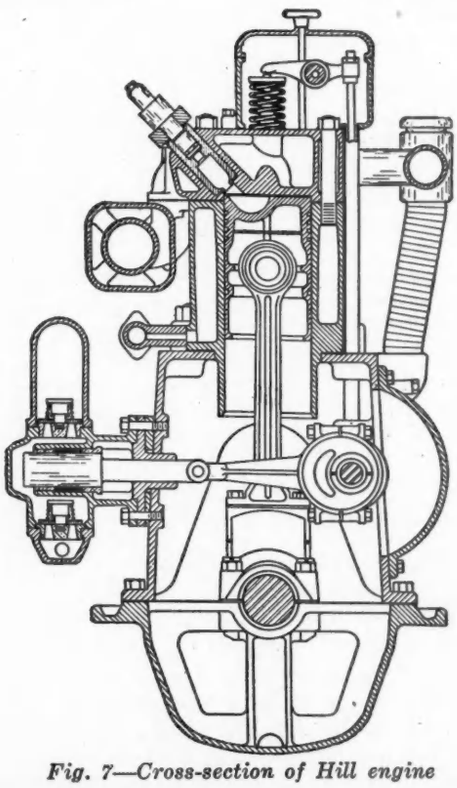


Fig. 7—Cross-section of Hill engine

with its own fuel pump, pressure and metering device. Proper distribution of the load between the engine cylinders, which is extremely important in high-speed engines, is given as the reason for the departure from the original design.

Another aircraft oil engine depends upon the same method of fuel injection (the Beardmore is the engine that powers the new British dirigible R-101), namely, the Packard radial Diesel. Nothing authentic has been published about this engine, which was the first oil engine in this country to go "up in the air," on Sept. 19, 1928, and later powered an airplane in a 650-mile trip on May 13, 1929. A German engineer, Dr. Dorner, had a hand in designing its fuel injection system, and since Dr. Dorner designed a high-speed automotive Diesel engine in Germany, on which a comprehensive report was published by Prof. Kurt Neumann, it is assumed that the same system is employed on the Packard radial.

The sustained rating of the Packard radial is 200 hp. and it weighs 600 lb. or 3 lb. per hp.

In the original Dorner engine a b.m.e.p. of 95.5 lb. per sq. in. was obtained with only 21 per cent of excess air. This good performance is ascribed to the constant volume cycle adopted, which gives an explosion pressure of 1000 lb. per sq. in. and even more, and incidentally may furnish all the turbulence required for such thorough utilization of the air charge as has been demonstrated. The fuel pump, which has to maintain combustion on the dead center, is driven by a separate camshaft, and the pump and injector are combined in a single unit. Figs. 5 and 6 show the details of the pump drive and how the pump stroke is altered without changing the timing of the injection and its duration. The farther the roller r_2 is moved away from center o, the greater the effective stroke; but the stroke always begins at the same time and its duration is not changed. There are no suction valves on the pump. The plunger uncovers the suction port s, and fuel is drawn in by the vacuum created. Two hardened steel balls serve as discharge valves, and the fuel, passing them, enters immediately into the injector, which is in the shape of a light poppet valve. Being extremely light, it follows the movements of the plunger accurately.

In another German engine, the Colo Diesel, a steel plug mounted in the center of the piston enters into the neck of a chamber formed in the cylinder head, and through displacer action produces violent turbulence inside the chamber on the compression stroke of the piston, while on the power stroke the heavy pressures of combustion are confined to the chamber, and a flat-top card results. The engine is manufactured in from one to six-cylinder types, all with the same size of cylinder (5 by 7 in.).

An American development of the same type of engine resulted in the new Hill engine illustrated in Fig. 7. In this the original cup is transformed into a cavity through which the fuel spray passes under pressure from the pump. This company manufactures a 5 by 7-in. cylinder rated at 12.5 hp. at 1000 r.p.m. and a 6 by 10-in. cylinder rated at 20 hp. per cylinder, engines being made in two, four and six-cylinder types.

The discussion was opened by E. R. Hailer, engineer from the Mercedes-Benz factory in Germany, who gave some of the details of construction and the performance figures on the new Mercedes-Benz Diesel engine which is expected here very shortly. This engine, known as their Type OM-26, is a full Diesel, four-cycle, with solid fuel injection utilizing the Bosch fuel pump system. It will feature the precombustion chamber which characterizes the Benz engines. This engine is provided with a seven-bearing crankshaft, a vibration damper, and full-pressure lubrication. It is a six-cylinder 5 by 6-in. engine and on dynamometer tests it has given the following results, indicating a maximum b.m.e.p. of 58 lb. p. sq. in. at 1200 r.p.m.

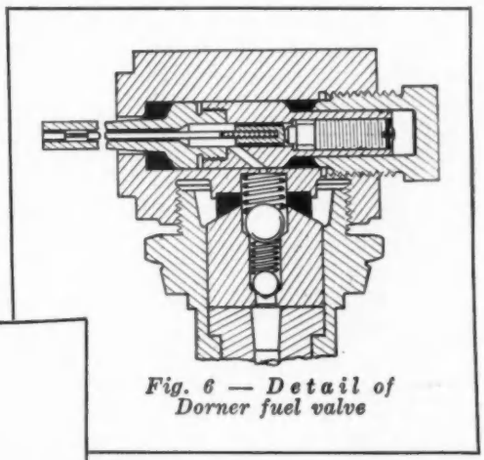


Fig. 6 — Detail of Dorner fuel valve

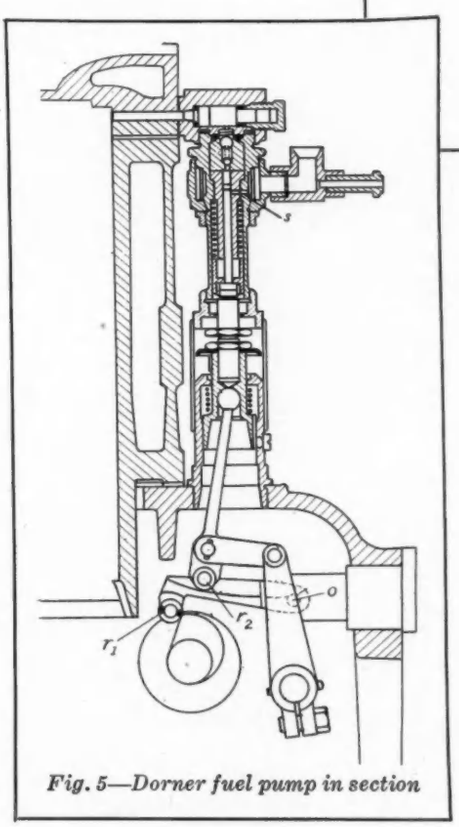


Fig. 5—Dorner fuel pump in section

R.P.M.	B.HP.	Torque (Lb. ft.)
600	27	220
800	37	250
1,000	50	270
1,200	62	270
1,400	70	265
1,600	78	250

It is particularly interesting to note the straight line torque characteristics of this engine. The specific fuel consumption is practically constant over the entire operating range, varying only between 0.496 and 441 lb. per b.hp.-hr. at peak load. The Model OM-5 Mercedes-Benz engine, 4¼ x 6½-in. six-cylinder, which is in service at present on a Public Service bus, has been in general use in Germany for about two years on trucks and buses.

R. W. A. Brewer said that the flash valve is at present the best available medium for the handling of the small charges required for small high-speed engines. He also emphasized the fact that positive pumping and accuracy in metering of the small charges are the chief difficulties confronting the designer of high-speed Diesel engines.

Replying to a question by E. B. Neil, secretary of the Pennsylvania Section, S.A.E., D. W. R. Morgan of the Westinghouse Co. confirmed the fact that the Beardmore engine for which his company has the American rights, was installed on the British Dirigible R-101 in its test flights. He also confirmed the statement of another speaker that these engines are not developing their estimated horsepower. However, the original diffi-

culties due to crankshaft vibration have been completely eliminated by getting a proper balance between the engine and propeller and by installing a vibration damper. He, too, stressed the fact that the major problem in designing the high-speed Diesel lies in the handling of the small charges of fuel, although he thinks one of the chief factors of this problem, namely, leakage in the pump, has been overcome by the use of better materials, making it possible to maintain minute clearances without danger of seizure. In his opinion, the flash valve is not commonly used. He closed with the thought that what the Diesel manufacturer needs at this time is the encouragement and cooperation of users, because the problems of high-speed engines are new and present many unusual difficulties.

Otto Nonnenbrook of Dal Verne mentioned that the injection mechanism typified by the Bosch pump is gaining favor, because it is positive in action and invariable in performance under all conditions. He does not consider the by-pass fuel pump satisfactory because it requires frequent adjustment. In his opinion the maximum speed commercially possible is in the neighborhood of 1600 r.p.m., although some engines have been built with a speed close to 2500 r.p.m.

Mr. Frounfelder mentioned the latest Junkers double piston engine of 2⅞ bore by 10-in. stroke operating at 1000 r.p.m., which delivers 8 hp. per cylinder with the remarkable fuel economy of 0.32 to 0.33 lb. per b.hp.-hr.

Answering a question, Mr. Hailer stated that on the new Mercedes-Benz engine the compression pressure is 550 lb. per sq. in. and ignition pressure is about 800 lb. per sq. in. He also mentioned that this engine is provided with a removable plug in the exhaust manifold at each cylinder to permit observations of the character of the flame which serves as an index of the completeness of combustion. He also stated that the ignition plug in the precombustion chamber required a current of 10 amp. at 24 volts for about 15 seconds.

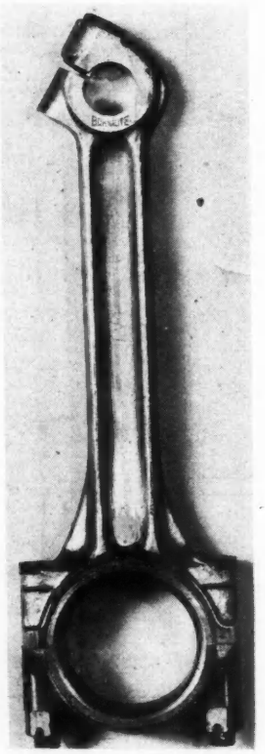
THE Government of Uruguay has put in effect a new decree concerning the duties to be paid on automobiles upon their entry into the country. Under this decree all passenger cars are divided into three classes. Those which are not capable of covering a distance of 120 kilometers with 20 liters of fuel will be subject to a duty 10 per cent in excess duty.

Bohn Develops New Connecting Rod

QUITE some years ago, when automotive engineers first began to thoroughly appreciate the effect of weight of reciprocating and rotating parts on engine vibration, aluminum alloy connecting rods and pistons were fairly widely used. As in the case of pistons, where the high expansion and fairly low wearing qualities of the product available at that time finally resulted in their being discarded very largely, aluminum alloy connecting rods also proved unsatisfactory in some respects.

Of the major disadvantages, the following were probably of the greatest importance: (1) Difficulty of controlling the big end bearing as to diameter under conditions of extreme temperatures. (2) Uneven distribution of the connecting rod bearing load around the circumference of the bearing itself, due to lack of rigidity. (3) Difficulty of babbitting. (4) Failure of rod at bolt hole bosses due to internal stresses set up largely by temperature changes.

Recently a new connecting rod of aluminum alloy has been introduced by the Bohn Aluminum & Brass Corp. which is said to overcome these disadvantages. The first difficulty, that of controlling the big-end diameter, according to Bohn engineers, is said to have been due to the impossibility of controlling the expansion of this end under heat. To overcome this the Bohnalite rod is fitted with a heat-treated steel cap, which is said to solve the problem of distortion in operation.



Connecting rod of aluminum alloy developed by the Bohn Aluminum & Brass Corp.

Naturally, it should therefore also provide a solution for the second difficulty. In this respect the connecting rod is analogous to the Nelson type of piston, where steel is also used to control expansion. The third difficulty, that of babbitting, proved quite a problem. Primarily, to have sufficient tensile strength, the rod must be forged and heat-treated. It was soon found, however, that tinning the rod, which involves raising the temperature of the big end in the tinning bath, resulted in destroying much of the strength near the big end, which had been imparted to it by heat-treatment, usually a drop of around 30 to 50 points Brinell.

Bohn engineers, while not ready to divulge details, state that they have developed a method of babbitting the big end which does not result in any reduction in strength of the big end. In fact the Bohnalite rods are offered on a minimum tensile basis of 50,000 lb. per sq. in. Bohnalite rods are therefore sold only in the babbitted condition and are then shipped complete with caps in either semi-finished or completely finished state, according to the customer's desire.

Failure of the rods at bolt holes is also said to be overcome by this method of babbitting as well as by the design of the bolt and the webbing for the bolt bosses, which imparts additional strength at this point. The steel bearing caps can be produced by the motor manufacturer if desired, and shipped to Bohn Aluminum for babbitting.

Rods are available either with a split small end and lock screw boss for the piston pin, or if a full-floating pin construction is desired a steel bushing with a lining of bearing material is pressed into the small end of the connecting rod.

In the case of the locking type of pin end the rod has also been strengthened over former designs to prevent any chance of breaking at this point also.

First Indianapolis Classic Racer Announced by *Louis Meyer*

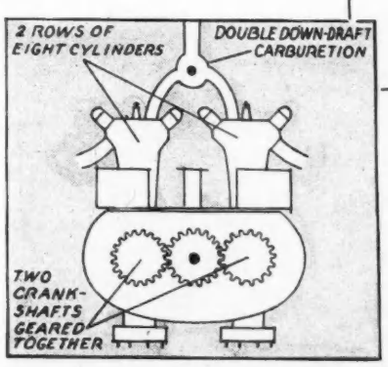
Sixteen-cylinder, two-bank engine with crankshafts geared together is being built by Harry Miller and Riley Brett

By HARRY E. MACPHERSON
Automobile Editor, Pasadena (Calif.) Post

THE first announcement of plans for a new car to be entered in the 500-mile race at Indianapolis next May has come from Louis Meyer and Riley Brett, who have designed a multi-cylinder car, streamlined for speed and using dual carburetion, extra valves per cylinder with a potential top speed of 135 to 140 m.p.h. on the Speedway.

Louis Meyer, the accredited speedway champion of America, will drive the new racer, and Riley Brett will be the mechanician, or the second man in the car, as required under the new Indianapolis Race rules. The construction has started in Harry A. Miller's shop under the direction of Mr. Brett.

While details of the car are as yet in the preliminary blueprint stage, the general features of the design have been announced. It will be powered by a 16-cylinder engine, comprising two parallel eight-in-line banks with double-geared crankshafts. The engine will have 183 cu. in. total displacement and develop 250 hp. Downdraught carburetion, with two carburetors, has been decided upon as one of the features of construction.



Cross-section plan of engine to be built for Lou Meyer's Indianapolis entry

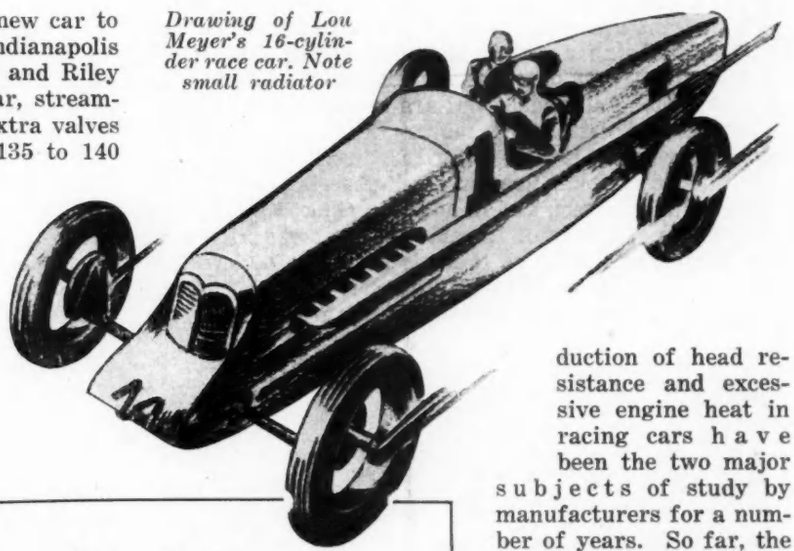
There will be two valves to each cylinder. Extra high compression will require the use of ethyl gasoline for fuel.

Included in the announced plans is mention of the use of ethylene-glycol as a coolant. Reduction of head resistance and excessive engine heat in racing cars have been the two major subjects of study by manufacturers for a number of years. So far, the use of ethylene-glycol has been confined to practical use in airplanes, and to experimental work on automobiles. This, therefore, will be the first time the new coolant has had a practical test, and this test will be watched closely by engineers of the industry. In the accompanying drawing of the car it will be noted that the radiator is pictured at about the size of the unit used in the 91-in. jobs required in previous Indianapolis races. Introduction of the new coolant makes this small-size radiator possible.

The weight of the car will be 1750 lb. and the body will be streamlined to a great degree to obtain added speed. The cost is said to be about $20,000.

The champion driver's new car, as planned so far, comes within the major requirements of the rules for the Indianapolis race next Decoration Day. The requirements, as promulgated by the Contest Board of the American Automobile Association last May, allow a maximum engine displacement of 366 cu. in. and gross weight of 1750 lb.

Drawing of Lou Meyer's 16-cylinder race car. Note small radiator



Here It Is

FREDERICK E. MOSKOVICS, who has taken an active part in automobile contests for the past 25 years, predicted in AUTOMOTIVE INDUSTRIES *of July 27 that the new Indianapolis Race rules would develop freak racing cars instead of stock models. At that time he defined a "freak" as a car with 16 cylinders in two separate banks of eight cylinders, with crankshafts geared together and developing 200 to 250 hp. without a blower. The car would be streamlined to the last degree.*

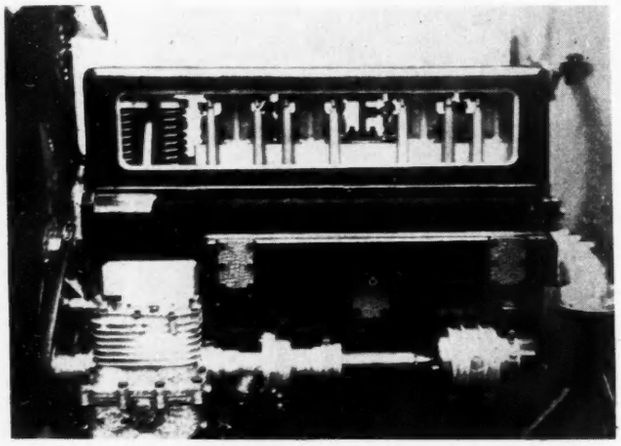
In an article in AUTOMOTIVE INDUSTRIES *of Aug. 3, Captain E. V. Rickenbacker, president of the Indianapolis Motor Speedway, replied to Mr. Moskovics by stating that such a car would be possible under the new rules, but probably would not finish.*

Diesel Engines Are Shown in Indicating Lowering of

Renault exhibits five-ton truck with four-cylinder engine combined, with clutch and transmission in single unit. Other manufacturers show fuel oil units.

ELEVEN distinct chassis with Diesel engines at the recent Paris Truck Show indicate the importance now being attached to heavy oil as a substitute for gasoline. In practically all cases the engines are not experimental models, but are in regular production.

As the biggest truck maker in France, Renault's appearance in this field is interesting. This company exhibited a complete five-ton truck chassis powered by a four-cylinder Diesel, and in addition showed a six-cylinder engine. In view of Renault"s close connection with the Paris Bus Company, there is reason to believe that the Diesel engine will be put into service on Paris streets at an early date, the inducement naturally being the lower fuel costs compared with the present mixture of 93 per cent low-test gasoline and 7 per cent benzol.



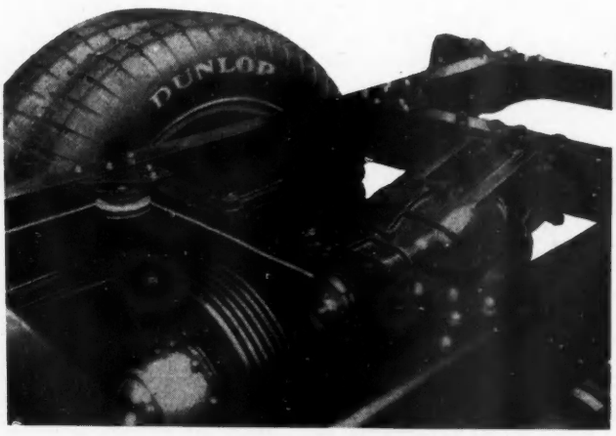
Morton four-cylinder two-stroke Diesel engine with air compressor for starting and tire inflation

Both the four and six-cylinder Renault models have a bore and stroke of 115 by 180 mm. (4.53 by 7.10 in.). Official tests carried out by the French government showed that the six-cylinder engine developed 63 hp. at 750 r.p.m., 90.5 hp. at 1215 r.p.m., and peaked at 1520 r.p.m. with an output of 91.2 hp. The best fuel consumption was 0.46 lb. p. hp.-hr. when developing 70 hp.

The engines have vertical valves in the head, operated by pushrods and rockers from a camshaft in the base chamber. The Bosch fuel pump is used. The four-cylinder engine has cylinders and crankcase in one casting, a five-bearing crankshaft, pistons with five rings and a compression of 425 lb. p. sq. in. The water pump is at the forward end of the cylinder block and is driven by twin belts off two pulleys on the crankshaft. The radiator is in front, fitted with shutters, but the water filler is under the hood in order to maintain the distinctive Renault outline. The weight of the engine is 1100 lb., or 22 lb. par horsepower at 1200 r.p.m.

In designing this five-ton truck, Renault has made important departures from his usual practice in chassis features. For the first time engine, clutch and transmission are one unit. An open driveshaft with Spicer universal joints is used, and the rear axle is double-reduction type by spur and bevel gears. Brakes on the four wheels are applied through a friction servo mechanism driven off the transmission. Springs are semi-elliptic, front and rear.

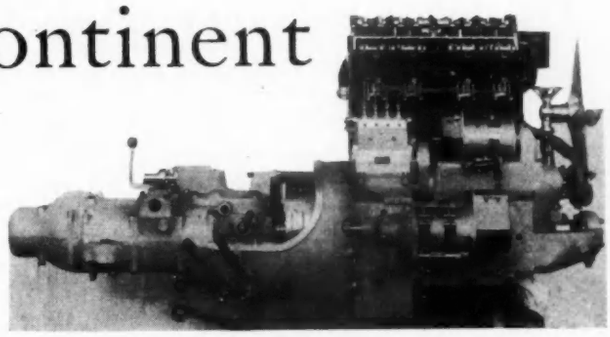
An aluminum casting is used for the cylinders and crankcase of the Morton four-cylinder two-stroke Diesel engine, with nitralloy steel liners set into the cylinder barrels. This engine has a bore and stroke of only 75 by 150 mm. (2.96 by 5.91 in.), and is said to be capable of running at 3000 r.p.m. The power output at 1500 r.p.m. is 40 hp. Both the engine and the chassis embody many distinctive features. The double-diameter pistons are in aluminum alloy and are attached to the three-bearing crankshaft by tubular connecting rods by a ball-and-socket joint inside the piston. Fuel is not delivered directly to the atomizers, but is sent into a small chamber at the front forward portion of the cylinder head, where it is maintained under pressure and then delivered through the two atomizers and distributors feeding the four cylinders. The pressure pump has a hand control enabling it to be turned with the engine



Morton rear axle construction

Eleven Chassis at Paris Show Fuel Costs on Continent

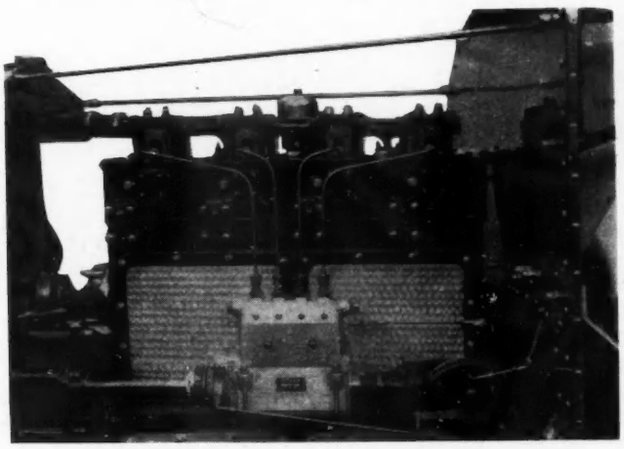
By W. F. BRADLEY



Saurer commercial vehicle power unit with four-cylinder Diesel engine

standing so as to deliver fuel under pressure into the accumulator chamber.

Lubrication is under pressure to the main bearings, the connecting rod bearings and up the hollow connecting rod to the ball-and-socket connection to the piston. Exhaust openings are on each side of the cylinder casting, the two manifolds being carried to the rear, where they join into a pipe back of the cylinder casting, and from this the gases are led down in the usual manner. The engine has an air compressor feeding three steel bottles, these latter being standard Michelin type as used for tire inflation, so that they can readily be changed or inflated at any service station. The compressed air is used for engine starting through a motor operating through a ring gear on the flywheel and also for applying one set of brakes, these consisting of four



Renault four-cylinder Diesel engine mounted in truck

shoes in the rear wheel drums, with an independent piston for each shoe.

Engine and transmission are a unit. The load is carried on two tubular dead axles, and power is transmitted to the rear wheels through two transverse cardan shafts from a differential and double-reduction gear in an aluminum housing secured to a frame cross-member. The driving wheels have several degrees of inclination from the vertical to allow for road camber. The six-ton truck is fitted with 40 by 8 in. pneumatic tires.

Having secured the Junkers rights for France a couple of years ago, the Societe Lilleoise des Moteurs is specializing on Diesel engines for road vehicles. These are two-cylinder vertical two-stroke with opposed pistons. The Peugeot Co. had a five-ton truck on exhibition with this type of engine; the Somua Co. exhibited a six-ton model, and Laffly had a two-ton model. In addition, a single-cylinder engine of 60 by 210 mm. (2.36 by 8.28 in.) bore and stroke, developing 10 hp. at 1200 r.p.m., was shown by two other makers on a light delivery truck.

Six-wheel chassis are slow in development. Those shown are Miesse, which has underslung worm for each driving axle; Mercedes-Benz, with internal gear drive for each of the two live axles; Berliet coach, with worm and internal gears for each axle, and the Chenard-Walcker tractor, with chain drive for each axle. The makes having three axles, of which only one is positively driven, are Mathis, with a 2000-lb. truck, and Willelme, with a 12-ton cattle truck. This latter has a "Liberty" engine, which is now almost entirely built in France.

The wheelbase of the two-axle coaches rarely exceeds 215 in. General features of construction are oil radiators, radiator shutters with thermostat control, servo brakes, double shoes in the rear wheel drums, front-wheel brakes and a transmission brake, giving seven brakes in all. On the new Laffly six-cylinder coach chassis the transmission brake is lined up with the wheel brakes when applied through the pedal and the vacuum servo, but when the hand lever is used it is only applied through the pressure of a spring, thus making it impossible for the driver to exert a greater force than can be transmitted through the spring. The drum is of big diameter, fitted with radiating vanes and can be used continuously on Alpine grades without overheating.

The Laffly is the only coach chassis in the show having two direct drives. Behind the normal three-speed transmission there is a second housing containing helical gears and dog clutches by which a second ratio, geared down 30 per cent in relation to high, can be obtained. In order to meet conditions in Northern Africa, where high speed is required, many of the coach chassis have ratios allowing a road speed of 60 miles an hour.

A light six-wheel tractor capable of hauling 20 tons has been produced by the Chenard & Walcker Co. It is powered by a sleeve-valve engine of 100 by 140 mm. (3.94 by 5.51 in.) bore and stroke, and transmits to the two rear axles by side chains working in flexible dustproof casings. A feature of this tractor is the attachment of the trailers with screw-and-nut gearing, allowing the pressure on the rear end of the tractor to be varied according to the load to be hauled. There are servo-operated brakes on the tractor wheels and also on the trailers, all operated through one pedal. The braking effort on the trailers is variable with the load.

Non-Skid Differential for Inter- Is Recommended *at S. A. E. Meeting*

Ordinary type results in stalling if one of four driving wheels should spin, and, in rough going, there would be more spinning than in two-wheeled drives, A. M. Wolf finds.

IN a paper on Six-Wheel Vehicles presented at the S.A.E. Transportation meeting in Toronto recently, A. M. Wolf, the author, gave a classification of such vehicles in which he listed no fewer than seven different types, as follows:

1. Two-wheel-drive tractor with semi-trailer.
2. Four-wheel-drive tractor with semi-trailer.
3. Rigid six-wheeler with only one pair of drive wheels.
4. Rigid six-wheeler with two pairs of rear drive wheels.
5. Rigid six-wheeler with two pairs of rear drive wheels combined with six-wheel trailer.
6. Rigid six-wheeler with one pair of front and one pair of rear drive wheels.
7. Rigid six-wheeler with all wheels driving.

Mr. Wolf said in his paper that he does not consider an inter-axle differential of the ordinary type desirable, because with such a differential, if one of the four driving wheels should spin, all four become ineffective. In rough going one wheel would be off the ground a good deal of the time, and there would be much more spinning of drive wheels than in an ordinary two-wheel-drive truck.

Without an inter-axle differential however, should one wheel have an opportunity to slip, the entire driving torque must be taken by the other axle. This occurs a good deal of the time when off the highway. Therefore, for cross-country work each axle should be capable of transmitting the full torque which the engine is capable of supplying to each driving wheel. The chances of skidding are lessened by omitting the differential between axles.

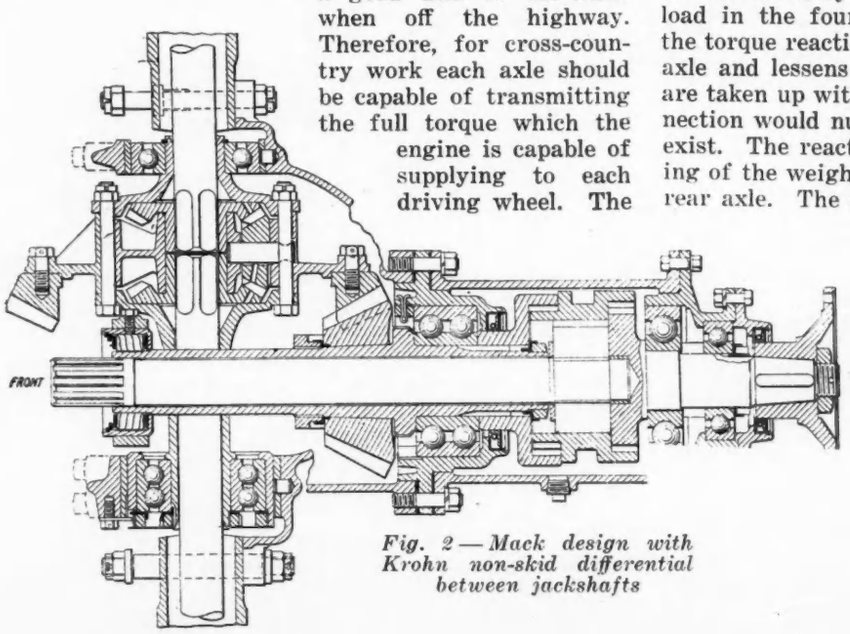


Fig. 2 — Mack design with Krohn non-skid differential between jackshafts

In a new Mack six-wheel chassis of recent design, hypoid gears are used for the drive from the transmission to the jackshaft. Fig. 1 shows the original design of this chain-driven rear end, in which no differential was used between the two jackshafts. Subsequently the unit shown in Fig. 2 was substituted for the forward jackshaft. It will be noted that the drive is taken to a Krohn differential, from which power is conveyed to the forward pinion by means of a sleeve, and to the rear through the tail stub shown. The previously mentioned shortcomings of the construction with a standard differential do not hold with a special type of non-spinning differential, and the ideal of four-wheel traction is possible, depending upon the efficiency, durability and proper functioning of the compensating device.

It is interesting to note that keys have been eliminated in some of the vital mountings of the Mack design, a jaw-clutch type of construction being substituted. The spherical spring ends are of interest, as is also the auxiliary cross spring above each axle.

Attention is called to the four radius rods in the Mack design, which provides each axle with individual means for taking up torque reaction, besides means of taking the driving thrust. This differs from the usual construction in which a bogie unit is self-contained with respect to torque reaction. The weight on the bogie is not increased by the driving torque, as is the rear axle load in the four-wheel, rear-driven vehicle, in which the torque reaction augments the static load on the rear axle and lessens that on the front axle. All reactions are taken up within the bogie unit, and the pivotal connection would nullify any torque transmission if it did exist. The reactions of the two axles result in a shifting of the weight from the forward driving axle to the rear axle. The equalizing beam divides the static load equally between the axles, assuming the pivot to be centrally located, as is the rule. Under driving torque, the downward pressure of the forward axle becomes less than one-half the static-load value. With independent torque reactions to the frame, as in the Mack construction, the static load on each axle is augmented when driving.

Many who witnessed the hill or ramp-climbing demonstrations at Camp Holabird last June were surprised that some of the six-wheelers would reach a certain point on the hill and then slide backward in spite

Axle Use on *Six-Wheeled Trucks*

of their four-wheel traction. The shift in weight on the axles of the bogie unit under severe driving conditions, augmented by frame and load weight through the pivot due to the tilted position of the vehicle on the hill, brought about an unstable or incipient rearing condition of the bogie; therefore traction on the rearmost axle was lost, because of unsteady torque from the jockeying of the bogie unit. If sliding started, the "digging in" of the rear axle held the forward bogie-axle in the air.

The extreme angularity of the universal-joint ahead of the forward axle was evident in the same tests. The worm shafts are maintained parallel to the frame and to each other, and therefore would not suffer from periodic speed fluctuations; but the relative rise and fall of the forward joint is considerable, and most vehicles do not provide sufficient propeller-shaft length between the transmission and the bogie unit to make the resulting angle as little as it might be.

In Fig. 3 are shown diagrams of various suspensions for six-wheelers that have been used or proposed. In the A and B types no attempt is made to compensate for uneven terrain. Experience has shown that this arrangement has real virtues, though at first glance it appears incorrect. The equalizer beam serves ideally for ordinary work, but it is necessary to provide stops or straps to limit the movement in severe service. In going over an obstacle, one axle or its beam-end will come against a stop, and the other axle will ride free from the ground. In backing up to an excavation, if the rearmost axle is allowed to run clear of the ground and hang in mid-air, the stop or strap will catch it and throw the full load on the other axle.

One axle will come off the ground a little sooner in the A and B type than in the J and K types with stops; it is only a question of the time element between the two, and the simpler construction results in less severe punishment all around for cross-country work, in which one wheel or axle is certain to be off the ground part of the time. The question arises as to whether the flexibility is sufficient to take care of what unevenness might occur on good ground. Load is not transferred from one axle to the other in this construction, because the independent springs take the torque reaction.

When one axle is entirely off the ground, the other naturally must support the full weight; hence, for severe service, each axle should be sufficiently strong to be able to do this. The same condition has been mentioned regarding torque capacity. It is safe to say that two 2½-ton axles cannot be substituted for one 5-ton axle, and, except under ideal conditions, be subjected to the same static and torque loads without difficulty ensuing.

Type *B* mounting, of Fig. 3, is used on the Coleman

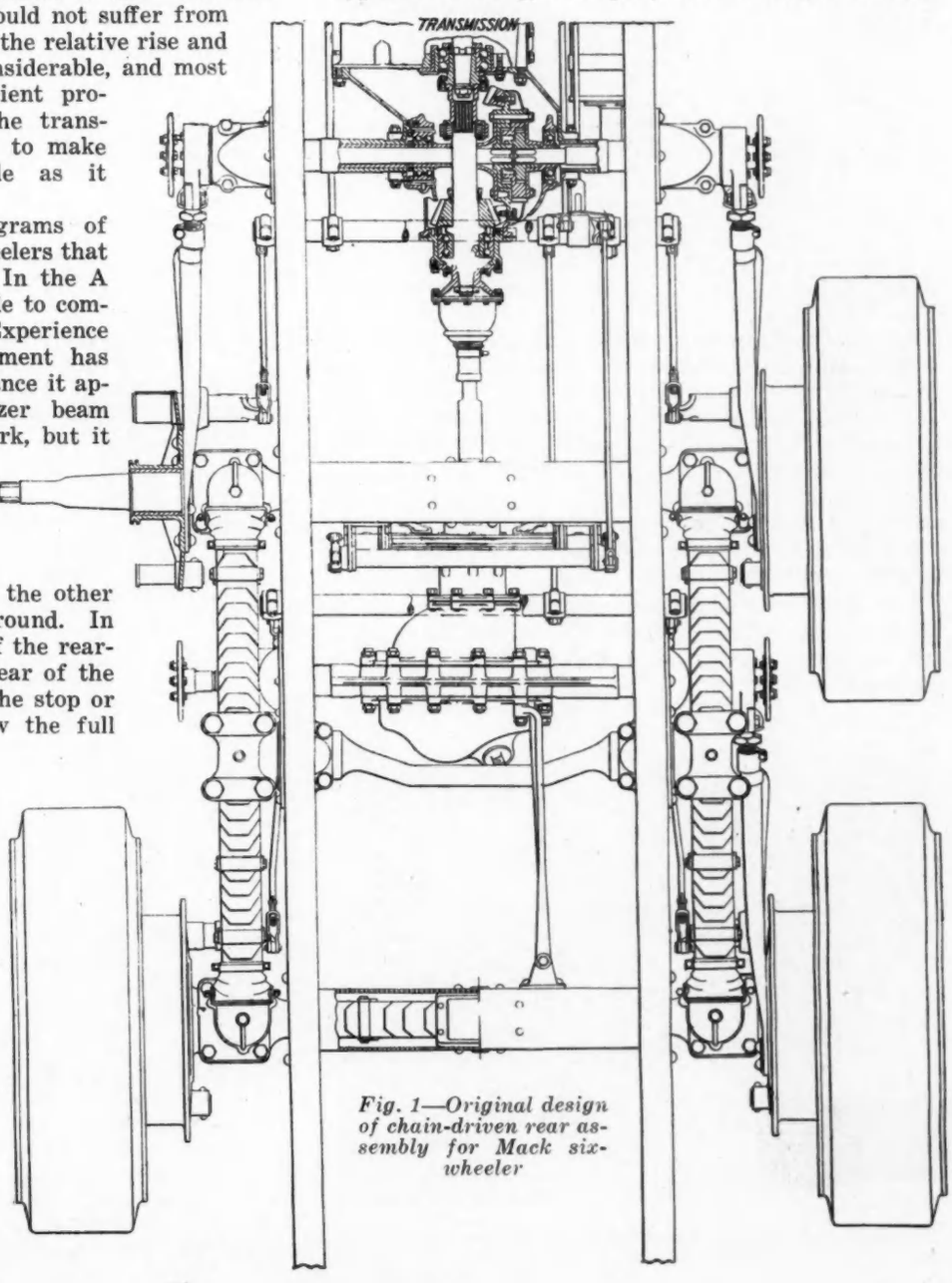


Fig. 1—Original design of chain-driven rear assembly for Mack six-wheeler

truck chassis. Type *C* is incorporated in the Versare construction. The short lever assumes a considerable angle in rough work, but it is adapted for motorcoach service on good roads. Types *E* and *F* are combinations of *C* and *K* and C and *D*, respectively. In *G* and *H*, bellcranks and connecting-rods replace the levers of *C* and *D*. The Paris Omnibus Co.'s original six-wheeler had a trailer axle behind the driving axle, and the two were equalized by means of bellcrank levers. Type *I* was used by Renault on his trans-Sahara vehicle. Types *J* and *K* predominate today. The Scammell construction approaches the *K* type, except that the equalizing beams between the axles are replaced by the gearcases between the wheels. This classification should interest designers.

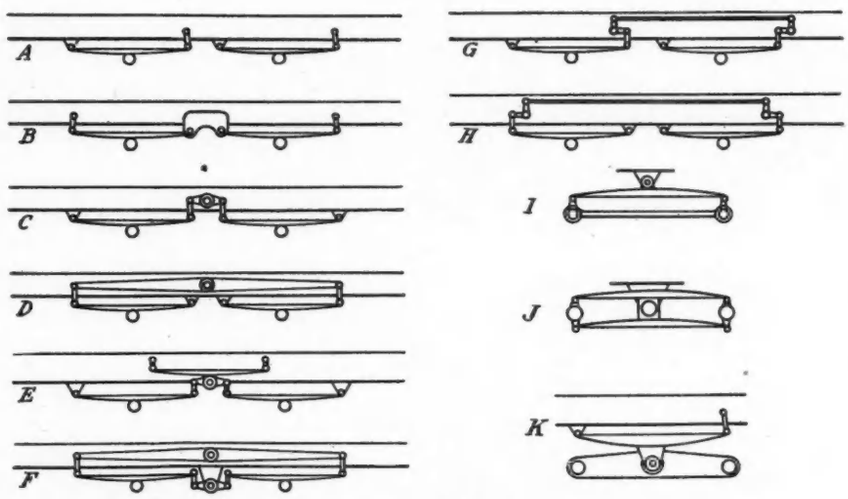


Fig. 3—Various types of suspension systems for the rear end of six-wheelers

Three-Head Machine Installations

A MACHINE recently was built by the Bradford Machine Tool Co., Cincinnati, Ohio, for Dodge Bros. Motor Car Co. for drilling 12 23/64 in. holes in the flange and drilling and reaming two 0.8625 in. cross pin holes in the differential case. This machine is shown in Fig. 1.

In operation, the casting is clamped into the fixture by means of a quick-acting clamp. A hand valve mounted on the table then starts all the heads by actuating small air cylinders. Simultaneously, all spindles advance, complete their operation, and then return to the neutral position and stop. The floor to floor time is approximately 1 minute.

Fig. 2 shows an adaptation of this machine for the Westinghouse Electric & Mfg. Co. for drilling oil holes and a large connecting hole, semi-automatically, in crankshafts.

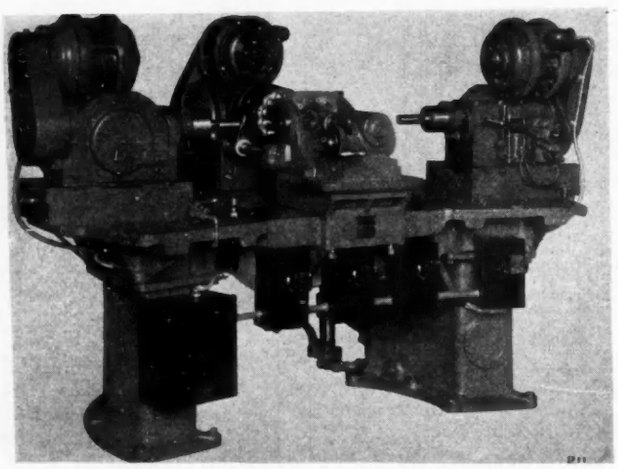


Fig. 1—Bradford installation for differential case operation at the Dodge plant

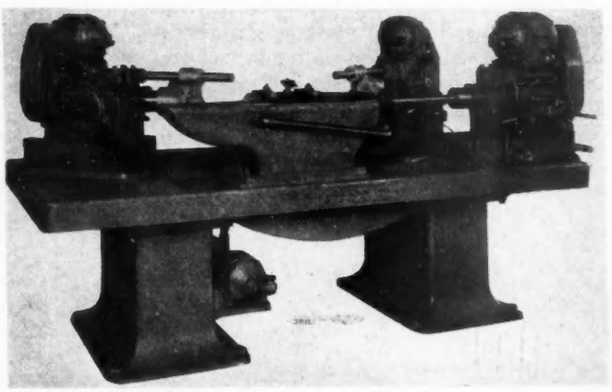


Fig. 2—Semi-automatic machine for drilling oil holes in crankshafts by the Westinghouse Electric & Mfg. Co.

In operation, the work is clamped in the fixture and the heads are started simultaneously by means of an air valve. The master head at the right, front, completes its first cycle, drilling to a depth of 4 in. before the ¼-in. drills penetrate the connecting hole. It then recedes and when the two ¼-in. drills have started on their return stroke, the operator advances the master head to the front station by means of a hand lever and trips its feed control for the second cycle which completes the full depth of 7⅞ in. The floor to floor time is 6 minutes.

THE Roller-Smith Co., 233 Broadway, New York City, N. Y., announces a new issue of its Bulletin No. 810, covering Types TW, FW and STW thermocouple ammeters and milliammeters for direct current and alternating current of all frequencies, including radio frequencies. The Type TW (3½ in.) and FW (4 in.) cover a range of 100 m.a. to 200 amp. and the Type STW (7½ in.) from 10 to 100 amp.

Cleaning Body Surfaces for Coating Effective *with Neutralizer*

Deoxidine cuts soldering flux, perspiration and corrosion on metal surfaces and insures lasting qualities of finish.

By ATHEL F. DENHAM

DURING the past few years there has been a growing appreciation in the automotive industry that, to obtain a surface coating which will not rust through, chip, or flake off, it is absolutely essential to have a thoroughly clean and neutral surface to begin with. This statement may seem perfectly obvious to anyone at all acquainted with either plating, enameling or lacquering methods, but the length to which this cleaning and neutralizing has to be carried, is less frequently appreciated.

In the preparation of surfaces for lacquering and enameling the following factors have to be kept in mind:

1. All grease, oil and foreign matter must be removed.
2. All rust must be removed.
3. The cleaned surface must have the ability to resist corrosion until the protective coating is applied.
4. The surface should be coated as quickly as possible after cleaning.

Of the various requirements, probably the two most important ones, being most difficult to control, are rust itself and acids which induce corrosion. Of the latter, acid fumes from soldering flux on bodies and perspiration from the hands of workmen on both bodies and sheet metal, are probably the greatest trouble-makers since they seem relatively unimportant.

The first must be thoroughly neutralized by the cleaning compound, for all soldering acids are active rust stimulators. The second is best prevented by not permitting the workmen's hands to touch the cleaned surface before coating.

Fig. 2—This interesting automatic brush installation for removing dried cleaner from bodies before painting is in use at the Wayne plant of Graham-Paige. Brushes are held against the body by spring control and are motor-driven

Fig. 1—Spraying Deoxidine cleaner on Graham-Paige bodies. Two operators spray the body, one working on each side of the line

These requisites sound expensive, but it has been conclusively proved that adherence to them saves money in the end, primarily because the nature of the cleaning itself indicates the desirability of automatic or semi-automatic handling on conveyors and the consequent elimination of manual labor.

The Deoxidine process, which

has been used very generally for cleaning bodies preparatory to painting, is sufficiently flexible to adapt itself to a variety of conditions. Where rust is excessively heavy, the wet process is preferable but where bodies are comparatively free from heavy rust coatings, the dry cleaning can be used.

The Graham-Paige Motors Corp., by reason of neutralizing the soldering acid shortly after it is applied and by taking the other necessary steps to prevent rust, is able to deliver the bodies to the cleaning line in a condition that has recommended the dry cleaning Deoxidine process, which is now being used by them. In this modification of the Deoxidine process, sufficient clay is added to the liquid to convert it into a sort of paint which is sprayed on the metal and permitted to dry to a powder which may be removed by brushing, thus carrying away not only the dry cleaner but the objectionable materials that were present on the metal.

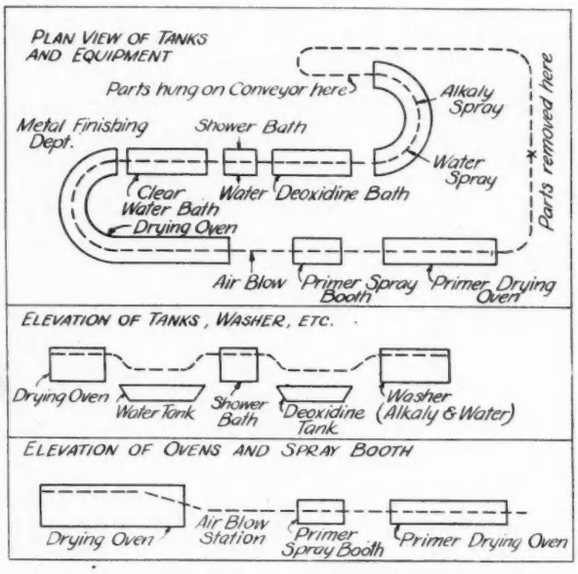


Fig. 3—Layout of the Lincoln fender cleaning line using Deoxidine liquid cleaner

The liquid is sprayed on the finished body in a manner similar to primer coats, as shown in Fig. 1, two spray booths being used, one on each side of the body. These are built into the entrance end of a drying oven. The body being mounted on a truck attached to a chain conveyor, it then moves into the drying oven from which it emerges in 30 minutes with the coating thoroughly dried.

The tendency of this material to dry out and become dust-like, while absorbing the foreign matter and neutralizing acids and removing rust, makes it possible to use mechanical brushes for its removal.

An interesting set-up for automatically brushing the dry cleaner off the body sides is shown in Fig. 2, where the large rotary vertical brushes are held against the side by spring tension, while the body is passing through. Hand brushes and motor driven brushes are used to clean the top of the cowl, rear panels, window reveals, etc., and a pick-up with the tack rag then follows. Immediately from here the body enters the primer coat spray booth at the entrance end of another oven, the entire operation being in a straight line.

Improper removal of the dry cleaner itself is not particularly harmful, since the powder is dry and inert and at most simply adds a little additional pigment to the applied paint coating. large amounts should not be permitted to remain, however, as they naturally will cause a rough coating due to its mechanical effect.

To obtain durable enameled finishes on fenders, wire wheels, and the miscellaneous sheet metal parts of the automobile, it is as necessary to remove traces of alkali as it is to remove rust and those invisible chemicals that cause the development of rust under the applied coatings.

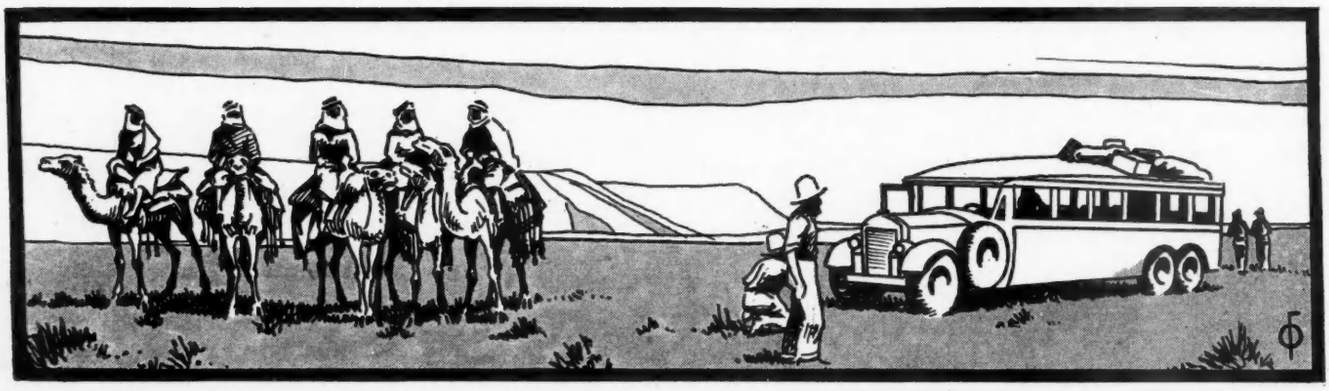
An interesting automatic process for the cleaning of these fenders and sheet metal parts before applying the primer coat is used by the Lincoln Motor Car Co.

After the fenders or other sheet metal parts have been metal-finished, they are hung on a monorail conveyor at the point indicated in Fig. 3, and are carried through a washing machine where they are subjected to an alkaline spray and are then immediately washed with a spray of water.

The conveyor then carries the parts into a steel tank containing a mixture of phosphoric acid and solvents, which is kept up to the proper strength by analyzing it at regular intervals and restoring the ingredients that are found necessary by the analysis.

The conveyor line next carries the parts through a shower bath of cold water and next into a tank of cold running water. The overflow from this tank is fed into the shower bath which precedes it. The fenders are then dried in an oven and upon emerging are air blown, tack ragged if necessary, and primed. They are removed from the conveyor line at the point indicated on the sketch.

There are no heavy coatings of rust to be removed by the cleaning processes but blushes of rust, acids deposited from the workmen's hands, and alkalis are removed by the treatment providing the surface for the enamel coating which is free from injurious materials. Care is exercised in order that the parts in the process of cleaning are not touched with bare hands until after the primer has been applied.



Higher Prices and Reduced Output Seen by *Linwood Miller*

Price-cutting policy would prevent manufacturers from improving dealers' business, which is vital to the industry, Willys-Overland president says

By EARL O. EWAN

Linwood A. Miller, president of Willys-Overland, Inc.

INCREASED passenger car prices would be, and doubtless will be, a natural and necessary companion to regulated automobile production in 1930 if the legitimate ratio of profits is to be maintained in the face of smaller volume output, in the opinion of Linwood A. Miller, president of Willys-Overland, Inc.

"The initiative shown by Studebaker in raising its prices is commendable, and no doubt will act as a stimulant to the proper morale in the industry," said Mr. Miller. "I hope passenger car manufacturers will not engage in a war of price-cutting, because such policy would prevent most manufacturers from doing all they should to improve their dealers' business, and that is vital and absolutely necessary to place this great industry on a sound basis."

It will be recalled that probably the most notable utterance of Mr. Miller since his election to the presidency of Willys-Overland on last July 16 was his announcement that his company was operating on a flexible production schedule, controlled by market demand. He went further in his statement by advocating the adoption of such flexible output schedules by all American passenger car manufacturers, and thus became the first outstanding executive of the industry to be a public exponent of regulated production. His attitude was endorsed quickly, to be sure, by Richard H. Scott, president of the Reo Motor Car Co., in a letter to Mr. Miller, asserting that Reo also had been quietly following that production policy.

As a reward for having adopted early this modus operandi, Willys-Overland now finds that its dealer stock situation is less embarrassing than that of certain manufacturers whose retailers have been perplexedly watching the swift approach of Dec. 31 with many more new cars on their floors than at the same time last year. The Willys-Overland car stock situation is particularly gratifying to Mr. Miller, since he sincerely appreciates that the dealers are the company's most valuable asset.

It was in line with this belief that Mr. Miller let it be known shortly after he was elected to his present office that nothing would be done to interfere with the development of dealer business. He announced that there would be no change in models that would interfere with sales, and consequently no embarrassing cleanups.

"I do not think we shall have to go through this situation again," said Mr. Miller in speaking of the dealer problem generally, "for I feel that beginning next year and continuing thereafter we manufacturers will control output better than ever before. I do not look for any of the production spurts early in 1930 that have been recorded in the industry at the opening of most years. Instead, I think that the manufacturers will get their output schedules under way slowly in the first quarter of 1930, which probably will rank well under the same period of previous years in the number of units turned out. The second quarter should show a marked improvement, however, and the third and fourth quarters should show output figures well in excess of those for the same periods of this year.

"I think in 1930 a business volume not in excess of that realized by the industry in 1928 would have a most wholesome and stabilizing effect. Next year should be a good year, particularly from the standpoint of replacements and exports. As you know, the 1923 cars are scheduled to come up for replacement in 1930, and there is every reason to indicate that our automobile exports will exceed the total volume of 1929. I say this with full knowledge of the very active revival of a movement for a European automobile cartel, which would place American cars on a quota basis, such as the one now applied to American films in France, Germany and other countries. I think, however, American automobile manufacturers are resourceful enough to surmount any obstacles of this nature that tend to obstruct their plans for an enlargement of their export program."

Mr. Miller expressed the belief that the effect of the recent stock market debacles would be felt in the sale of automobiles to a certain extent for the first few weeks of 1930, at the end of which he expects public confidence to be restored to a considerable degree. It has not been the stock market losses in themselves, but the apprehension they have engendered in the minds of the general public that has caused the unfavorable business trend, in his estimation.

Gas Furnaces for Heating Stock Have Been Improved in Design

Installations include 24 units for vari wheels, connecting rods and re uses 1,500,000,000 cu.

By J. B.
American Gas

MANY varieties of gas furnaces, some of very recent and unique design, for all kinds of work, may be seen at the different plants of the Ford Motor Co. While the consumption of gas in the industrial heating processes at the Fordson plant amounts to approximately 50,000,000 cu. ft. daily, as much as 1,500,000,000 cu. ft. a day has been used at the Highland Park plant.

The engineering staff of this company has made considerable advance in designing furnaces for heating stock prior to forging. There are 24 forging furnaces—six on the front axle job, three for upsetting the front axle, four for upsetting the radius foot, four on the connecting rod restrike job, four on the front wheel spindle restrike, two for front axle stretching and one for repairs.

A slot-type furnace with a mechanical pusher at one end is used in heating stock for forging out the front axle. This is 5 ft. wide, 8 ft. long and 8 ft. high. In designing this unit, stress was laid on the idea of getting the greatest amount of heat concentration at the discharge end, so that the stock would have its maximum temperature when removed and also for economy of fuel utilization. The flue is at the end opposite the burners, so that the waste gases, flowing in that direction, impart much of their heat to the incoming cold stock.

The furnaces may be roughly divided into preheat and heating chambers, for the burners, five in number, are located in the discharge end and back. They are overfired, the flames impinging on the work. The temperature at the discharge end is 2600 deg. Fahr., while that at the charging end is 2400 deg. Fahr. The time required to bring the stock up to forging heat is 21 minutes. Hearth deterioration is one of the most bothersome problems that a forging furnace presents, and a unique scheme for the prolongation of hearth life has been adopted. It consists of placing two lengths of 2-in. wrought iron pipe across and return on the hearth for the work to ride on. Cold water is circulated in this pipe, and this method has increased the hearth life to more than a year.

Wrought iron pipe was used on the hearth, since the cold water kept the temperature below the oxidizing point, 1000 deg. Fahr., but as the skin temperature of the pipe in the preheating chamber is about 1800 deg. Fahr., it was found necessary to use chrome steel pipe.

The preheating chamber occupies 2 ft. of the height of the furnace, and in it are five passes of 8-in. chrome steel pipe through which the gas passes prior to combustion. The burners are of the aspirating type, with gas at 800 deg. Fahr. being supplied for combustion. The gas-air ratio is regulated by spacing the burner tip and burner block, a longer space allowing a greater rate of aspiration. The heating system of this furnace is of the counter-flow type, the hot gases flowing in a direction opposite to the flow of the work.

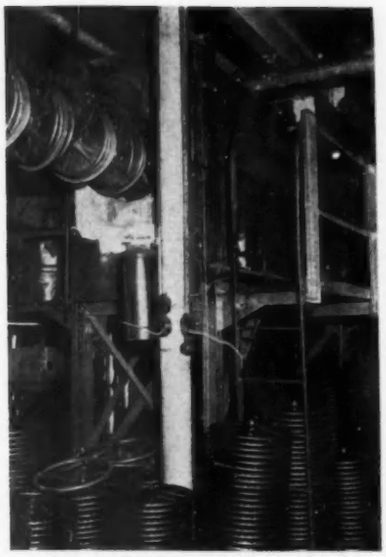
The front of the furnace and arch opening are partially closed with a movable shield of standard Dietrich blocks suspended by hangers which are hung on a 2-in. water-cooled wrought-iron pipe, supported by brackets at each end of the furnace shell. The slot for the work to ride through is formed by the

Gas-fired heat treating furnaces. The gas heated baths at the right are for drawing

Prior to Forging at Ford Plants

ous operations on front axles, front pair work. Highland Park ft. of gas per day.

NEALEY
Association



Burn-off oven for cleaning steering wheels. Note that an overhead conveyor carries the wheels in a continuous line into the oven

upper edge of the hearth and the lower edge of this shield, and can be made any width by adjusting the height of the shield. The preheat chamber has no arch, but is covered with 4-in. tile supported on brick piers from the steel work. The bottom of this chamber rests on 4-in. I beams located on the steel work from which the arch is suspended.

The furnace walls are 13½ in. thick, consisting of 4½ in. of Sil-O-Cel and 9 in. of firebrick. The burner blocks are of a special high-point fusing fire clay, and hold their shape at high temperatures. The efficiency of these furnaces is estimated as 32 per cent.

One of these furnaces has a capacity for 75 front axles per hour. As each end is forged separately, this makes 150 heats per hour, and 75 per cent of the stock is heated each time.

In heating the stock for the radius foot, a furnace 13 ft. long, 3½ ft. wide and 6 ft. high is used, and has a traveling chain conveyor equipped with special nichrome spindles to carry the work through. As the chain is located underneath the hearth, a slot runs the entire length of the hearth, through which the work protrudes into the combustion chamber. The conveyor is operated by an electric motor through speed - reduction gears.

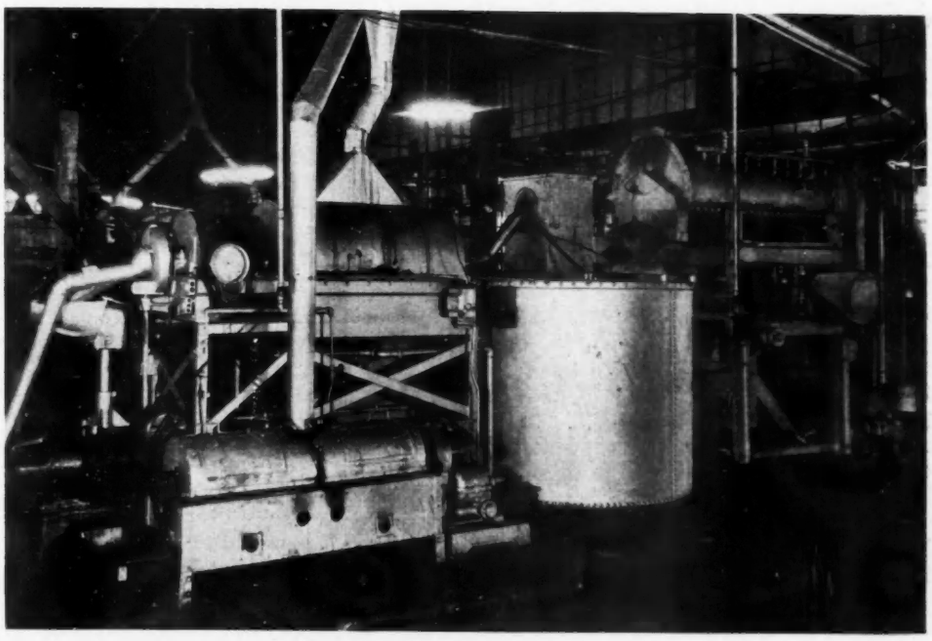
As these furnaces are used in conjunction with power upsetters, no springs are necessary to relieve the vibration. They are carried at 2600 deg. Fahr., while the flue gases in the vent run around 1000 deg. Fahr. One of these furnaces will heat 420 pieces per hour. All the conveyor, type units in this department are equipped with automatic temperature controls and recorders.

Three of the furnaces for heating the connecting rod for the restrike are similar to those just described, except that they are 20 ft. long, 5 ft. wide and 6 ft. high. Their capacity is 1000 rods per hour per furnace. They are equipped with traveling conveyors and eight burners are located on each side of the discharge end. The temperature at this end is 2200 deg. Fahr., and at the other, 1800 deg. Fahr., while the gas is preheated to 600 instead of 800 deg. Fahr.

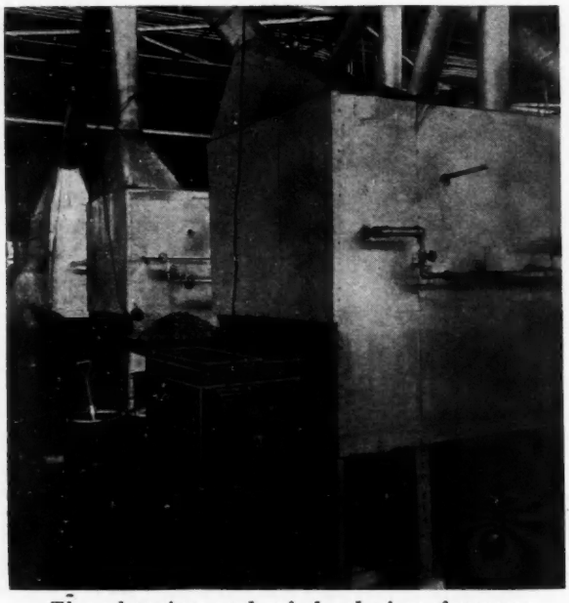
The flue area of these furnaces is so proportioned as to throw a slight back pressure on the burner tips, thereby cutting down the air in the gas-air ratio so as to maintain a reducing atmosphere in the combustion chamber and cut scaling to a minimum.

Instead of carrying the stock through for automatic discharge, as in most furnaces of this type, a side-door discharge is used. The end of the furnace has a solid wall, and just back of this a small opening is cut in each side so as to keep two operators and two hammers busy.

The front wheel spindle reheating furnaces for the restrike are exactly like those used for the radius foot. The temperature, however, is only 2300 deg. Fahr., and it takes 10 min. to bring the stock up to this heat.



A complete rotary gas-fired heat-treating furnace unit used in the Ford plant



The charging end of hardening furnaces utilizing gas fuel

In the heat-treating department are 22 normalizing furnaces built of brick and steel-encased. Some of these are 22 ft. long, 7 ft. wide and 10 ft. high for the first half, and 6½ ft. for the last half. The first half of the furnace has a double arch, with the gas burners located so as to fire in the space between. The lower arch is perforated and the heat is deflected down onto the work.

The first half of the furnace constitutes the heating chamber and the last half the cooling chamber, the work being heated according to a carefully worked out heat gradient. Eight gas burners are used in the heating half of the furnace. Some stock is heated to 1560 and some to 1650 deg. Fahr., according to section, analysis, etc. If heated to 1650 deg. Fahr., it is kept in this heat for approximately one hour, half of this time being necessary to bring the work up to the desired temperature, the other half being required for a soaking period, while the cooling period takes up another half hour. The work is discharged at about 1000 deg. Fahr. Practically the same time cycle holds for the stock heated to only 1560 deg. Fahr.

Automatic Temperature Control

The hearth is equipped with alloy steel rails, and the work is carried through on these rails by a mechanical pusher, operated by a motor through speed-reduction gears. In the double arch section, the lower arch is built of fire-clay blocks with a hole in each. The burners fire tangentially against the upper arch, and the heat is radiated and deflected down through the perforated arch into the heating chamber. The heat gradient is maintained by means of an automatic temperature control and recorder.

A preheating chamber with gas-pipe coils rests upon the double arch and the products of combustion are passed into it by means of a duct whence they are exhausted. The other normalizing furnaces are of exactly the same type, except that they are only 18 ft. long and use only six burners.

The ends of the brake rod cross-shaft are normalized in a duplex conveyor-type furnace, which is made up of two small combustion chambers with a slot running the length of a side wall in each. These combustion chambers are set parallel to each other, so that each end of the brake rod cross-shaft will protrude through one of the side wall slots into the normalizing furnace.

Both chambers are built into a single unit with a single arch, one preheater and one traveling conveyor which sets between the two and carries the work along. It is operated by a motor through speed-reduction gears. Each combustion chamber is 2 ft. in cross-section, 4½ ft. long, fired with four gas burners and is equipped with an automatic temperature control and recorder. These chambers are carried at 1750 deg. Fahr., and the work is heated to 1600 deg. Fahr. for 2½ min. The capacity of this unit is 30,000 shafts in 24 hr.

Instead of giving the ends of this shaft a hot upset, it is upset cold, and the normalizing treatment is given to relieve the strains.

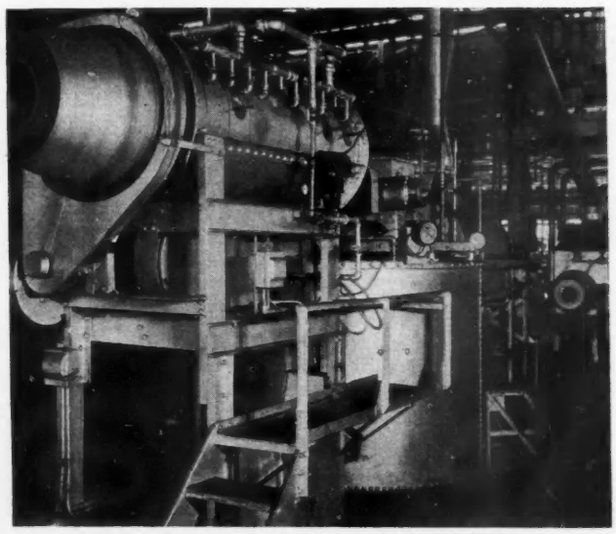
Many of the heat-treating furnaces are equipped with automatic temperature controls and recorders, while visible pyrometers, located in a central control room, are used on the others.

There are 16 furnaces for heat-treating the forgings after normalizing. They are of the same type as the normalizing units except that they are 14 ft. long and 7 ft. wide. The heights are 6½ and 10 ft. for the preheating and heating chambers respectively. The cooling chamber here becomes the preheating chamber. Each is equipped with nine burners, of which seven are on automatic control and two are controlled by hand.

Quenching and Hardening

The work is carried through by means of a pusher on plates or trays resting on alloy steel rails. It is dumped automatically into a quench, located partly under the discharge end of the furnace, through a hole in the hearth equipped with a chute extending into the quench, which also serves as a water seal. A third rail crosses the two on the hearth at the mouth of this chute and upsets trays, allowing the work to drop into the quench while the trays continue onto a discharge table.

The temperature range of the work in these hardening furnaces is from 1470 to 1500 deg. Fahr. It requires 2 hr. to bring the work up to temperature, and it is then immediately quenched. The quenching medium is a caustic solution in a steel tank 7 ft. square and 9 ft. long, which is provided with a continuous elevating conveyor of the belt type, which receives the work near the bottom of the tank and elevates and discharges it on to the charging table of the drawing furnace. The quench is cooled by recirculation through refrigeration. Each hardening furnace has a drawing furnace located



The rotary heat treating furnace. Note that the mechanism for rotating is guarded

in tandem with it so that the work passes from one to the other, through the quench, in a single straight line, with the minimum of time and labor. There are 16 of these drawing furnaces, and they are of the underfired type, that is, the gas burners are located so that they fire beneath the hearth.

These units are 22 ft. long, 7 ft. wide, 6½ ft. high and are provided with six gas burners, three firing on each side, and all located in the first half of the furnace. The work is carried straight through by the pushers and discharged into wheelbarrows, while the trays or plates are returned to the charging end of the hardening furnace by an overhead monorail. The work is removed to the pickling room and then to the machine shop.

Roller Bearing Furnaces

The temperature range used here is from 980 to 1000 deg. Fahr., the cross-section, steel analysis and Brinell hardness being the controlling factors. The heating period is 2½ hr. There is also a preheating chamber for heating the gas. Each furnace is equipped with an automatic temperature control and recorder.

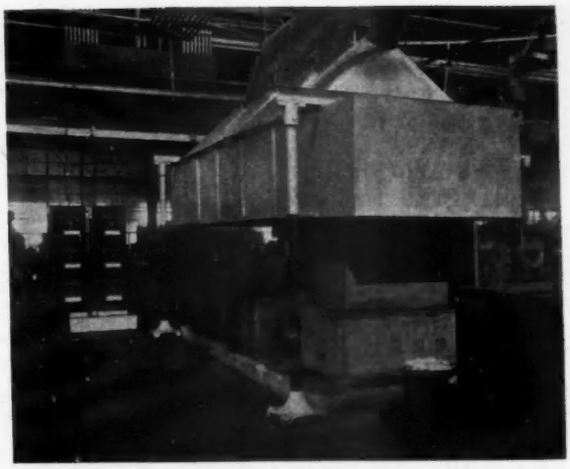
Die-casting machines in the Ford plant are gas-fired

In the roller bearing department are four hardening furnaces, 10 ft. long and 4 ft. wide, equipped with three gas burners equally spaced on each side. The work is carried through by a mechanical pusher and no preheater is used. An automatic temperature control with recorder maintains a temperature of 1520 deg. Fahr. and the heating period is 22 min.

One end of the quench tank is under the discharge end of the furnace. The work drops through a hole in the hearth directly into the quench and through a water seal chute which excludes air and prevents scaling. The quench is provided with an elevator conveyor for removing the work. The parts are drawn in a 50-50 solution of saltpeter and nitrate at 575 deg. Fahr. for 5 min.

Carburizing of the pinion gears is accomplished in four brick furnaces of the pusher type, which are 18 ft. long, 7 ft. wide and 10 ft. high. These furnaces have a double arch running the entire length, with four gas burners, equally spaced, on each side firing between the arches and tangentially to the upper.

The pinion gears first are normalized and machined,



Drawing furnaces in heat treating section, with panel board of recording pyrometers in the background

then they are packed in nichrome alloy steel boxes with the carburizing material. The gas is preheated in a chamber above the furnace. The work is heated to a temperature of 1750 deg. Fahr. and allowed to cool in the boxes after being discharged. The length of the heating period determines the depth of case, 21 min. giving a case from 0.035 to 0.038 in. thick, while 23 min. will bring it to about 0.046 in.

The sole of the hub is hardened in two lead pots set in a brick foundation and fired with four gas burners. These are standard nitrate pots of cast steel, 2½ by 4 ft. and 15 in. deep. Charcoal is spread over the surface of the melted lead to minimize oxidation and vaporization. A jig holds the hubs so that the heat is localized in the sole, which is subjected to a temperature of 1560 deg. Fahr. for 1½ min. Each pot has an automatic temperature control with recorder.

Oil draws of similar construction, three in number, are used to draw these gears at a temperature of 450 deg. Fahr. in a heating period of 1½ to 2 hr.

Front Axle Treatment

Regenerator-type furnaces with brick checkers are used in the heat-treatment of the front axle. These units are 22 ft. long, 12 ft. wide and 7 ft. high, while the checkers extend 12 ft. below the floor level. The checkers, located under each side of the furnace, are 4 ft. wide, and extend the full 22 ft. There are 17 of these furnaces used in hardening, normalizing, annealing and drawing.

A large gas burner is located on each side of the combustion chamber and they are fired alternately for 15-min. periods, the waste heat being drawn out through the opposite checkers as in an open hearth steel furnace. This heat is partially absorbed by the checkers and then given up to the fresh air that is drawn in for combustion.

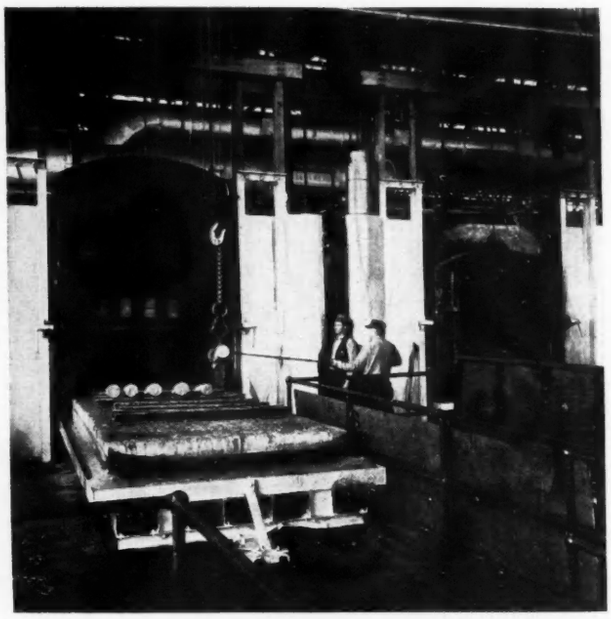
The work is pushed through on skid rails by a motor-driven pusher. The hardening temperatures range from 1470 deg. Fahr to 1500 deg. Fahr, and the work is in the furnace for 2½ hr. It takes 2 hr. to bring the work up to heat, and the last half hour serves as a soaking period. The capacity of one of these furnaces is 47,218 lb. of work in 24 hr.

The hearth extends a short way beyond the discharge end of the furnace, and the work is pushed out onto this table, from whence it is loaded into baskets and dropped into the quench by hoists. A quench of 7 to 10 per cent caustic soda solution is used. The temperature range in the drawing furnaces is from 980 to 1070 deg. Fahr.,

and the heating period is about 2½ hr. These units are arranged in tandem so that the work travels in a straight line with the minimum of time and labor.

A furnace that performs the double functions of hardening and drawing has been developed at this plant for heat-treating the rear axle. It is a double-deck furnace, 18 ft. long, 10 ft. high, 6 ft. wide, and is heated with seven gas burners, four located in one side and three in the other. These fire into the lower heating chamber, and the waste heat passes through ducts into the other heating chamber.

It requires 30 min. to bring the work up to a temperature of 1490 deg. Fahr. The work is carried through this chamber by means of a walking beam conveyor and is removed through a small opening in the side close to the discharge end. Here is located a quench tank containing a caustic solution with a machine which spins the work while submerged.



Car type furnaces for heat treating large die-blocks, locomotive side arms and similar units

A continuous chain conveyor carries the work through the upper and drawing chamber. This conveyor extends down over the front and back ends of the furnace for ease in charging at one end and so that the work can be cooled with a spray for handling at the other. The draw is accomplished at a temperature of 680 deg. Fahr. in 45 min. Automatic controls maintain the proper temperatures in both chambers, the one for the lower chamber by controlling the gas flow and the one for the upper by regulating the dampers in the ducts between the two. There are six of these furnaces, each one of which will treat 2400 axles in an 8-hr. period.

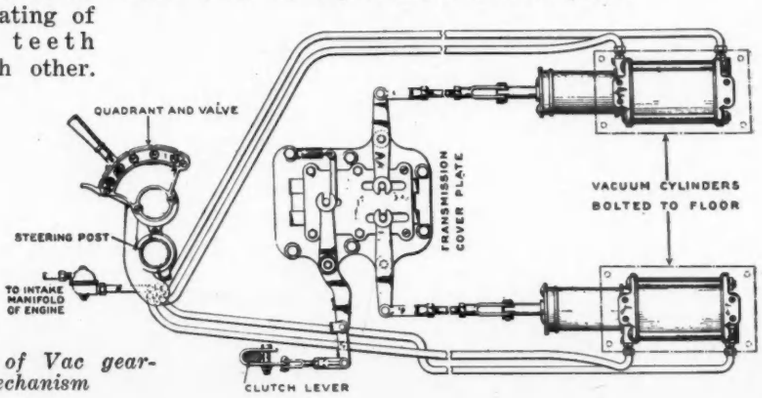
Universal Develops Vac Gearshift

A GEARSHIFT mechanism deriving its power from the inlet manifold of the engine has been developed by the Universal Gearshift Corp. of New Haven, Conn. With this device the driver selects the gear to which he wants to shift in advance by means of a selecting lever mounted on the steering post, which places the vacuum cylinder corresponding to this gear in communication with the inlet manifold. A locking disk on the transmission cover holds the gears in place until the clutch pedal is depressed, at which time they are shifted as desired. The clutch cannot be reengaged until the shifting operation is completed, which prevents grating of the gear teeth against each other.

Distributor valve of Vac vacuum shift on steering post

According to J. H. Newmark, who represents the manufacturers, the Vac gearshift is primarily designed for original equipment, but it can be installed also on existing cars without marring them. From the vacuum connection on the inlet manifold, which is found on most modern cars, a heavy copper tube leads to the steering post, where a check valve is inserted that regulates the pressure under all conditions. A conduit tube parallels the steering post and connects to a distributor mounted 2 in. below the steering wheel on the right side of the post. The various speed positions are plainly marked on the dial, with neutral positions between successive speed positions. The distributor is set by means of a small finger lever moving over the dial. From the distributor the vacuum is communicated to each end of two vacuum cylinders containing reciprocating pistons which actuate the transmission forks and slides.

Preselection is considered an important feature of the shifting device. The selector may be set at any time for any other speed than that on which the car is running, and when the proper time comes the shift can be made by merely depressing the clutch pedal.



General plan of Vac gearshift mechanism

Just Among Ourselves

Radical Changes In Design In Prospect for Late 1930

RADICAL engineering departures in stock car practice conceivably may be brought about by the strongly competitive conditions which will exist in 1930.

Sticking to sure-fire constructions and taking no chances whatever with anything out of the ordinary, doubtless will be the first reaction of conservatively minded manufacturers to the market situation now in prospect. Elimination of waste, reduction of overhead and concentration on familiar constructions, sure of public approval, if not enthusiasm, and producible at known manufacturing costs, probably will be the immediate and logical trend of the industry.

This policy will prove successful for some companies without question—perhaps for many—even if total production for next year falls behind this year's totals by some 15 per cent or more.

Others, almost inevitably, will find their sales curve gradually dropping downward, however, by persistence in this same policy.

And that, it seems to us, is where we may see some radical departures in stock car design before the end of 1930.

* * *

The Market Prospect May Force the Gamble

A FEW weeks ago we gave vent to the opinion that this is a time "when every effort should be concentrated on doing forcefully and vigorously all of the sound, practical things that every sales manager knows will help better to sell his products."

We believe that point warrants emphasis and repetition.

But even strenuous and intelligent application of this policy may fail to keep some organizations on a satisfactory basis.

To this group almost certainly will come the thought: "Can we afford *not* to take a chance?"

"No" seems certain to be the answer in a few cases before the next 12 months have passed.

And so, we wouldn't be a bit surprised to see incorporated into stock car practice by the end of 1930 a number of constructions, already well known and reasonably well proved, which never have been applied in regular production by any important car maker with an established distribution set-up capable of giving a radical design a fair chance of commercial success.

* * *

Decline In Market May Favor Exports

CHOOSING the man of our acquaintance likely to be the best informed, we asked his opinion of the effect of the market decline—if any—on automotive export business. He replied:

"I do not expect any important direct effect on the export business from the recent market decline, except a favorable effect due to the lowering of money rates, the release of capital from the United States and the larger opportunity for foreign countries to stabilize their loans.

"As a matter of fact, the decline in some elements from the business abroad, which has been visible this year, began during the period when the market was at its height in the United States, and when the financial stringency and raw material situation was at its most difficult point abroad."

* * *

Is Traffic Congestion Related to Car Design?

HAVE a letter from Ora Haibe, an ex-race driver, who thinks that maybe the car designers are really responsible for much of our traffic congestion. The supreme confidence which a race driver has in his ability to handle his car under all conditions, Haibe thinks, comes to a great extent from the fact that he can see his wheels. Getting into a stock automobile, he contends, gives even a race driver an inferiority complex.

"Inability to see both fenders," he contends, "makes even skillful drivers pass cars in a wide manner, with the result that streets which formerly would accommodate six lines of traffic now barely accommodate four lines. . . . While automobile manufacturers think that high radiators and high cowling are things of beauty, traffic conditions will be terrible even on streets 200 ft. wide."

This may have something to do with traffic congestion; probably it does, but there will be a big question, not only in the minds of car designers, but also in the minds of many car buyers, as to whether the cure is worse than the disease—for traffic congestion undoubtedly would continue to exist even though everybody still could see both of his car's front fenders. The Haibe idea is at least a new one to us, however, and well worth thinking about.

* * *

Automotive Securities Have Remarkable Recovery

IF you haven't read the first article in this magazine this week, won't you go back and do so? That is, if you have any interest in affairs of the stock market in general and of automotive stocks in particular.

Detailed calculations show that automotive stocks, having hit a good low bottom when they hit, have shown a greater resiliency than the average industrial list on the way back.

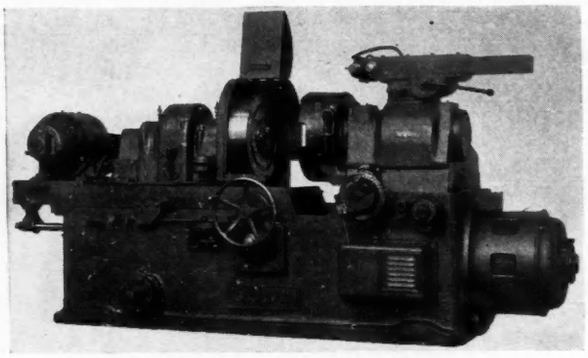
Surprising, isn't it? . . . At least it was to us. That's why we think you'll find the article particularly interesting at this time.—N. G. S.

NEW DEVELOPMENTS—Automotive

Brake Drum Grinder

THE Cincinnati brake drum grinder now being offered by Cincinnati Grinders, Inc., Cincinnati, Ohio, embodies features which constitute a considerable improvement over their previous models.

More safety for the operator is provided by the fully guarded grinding wheel. The guard is of cast steel and is removable. The mounting of the precision grinding wheel spindle on anti-friction bearings is another improvement. To bring the grinding wheel into the work the required distance an independent in-feed attachment



Cincinnati drum grinder

driven by a fractional horsepower motor is provided. This permits the grinding wheel to be fed into the work either by hand or power.

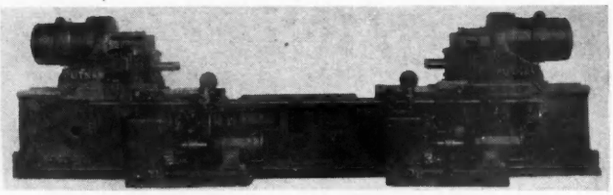
The grinding wheel truing equipment is mounted on the top of the wheel head and is operated by a hand lever. This grinder has a capacity to swing work up to 26 in. external diameter so that it accommodates not only unmounted drums but also wheel and drum assemblies. Inside diameters up to 22 in. can be ground on mounted drums. A 21½-in. rotary type magnetic chuck with a hardened and ground steel centering plate is supplied. Mechanical reciprocation of the work over a short stroke while the grinding wheel is automatically fed into the work is claimed to keep the ground surface smooth and free from wheel marks.

This machine is entirely self-contained, the grinding wheel being driven by a 40-hp. motor built into it and the work head powered by a 5-hp., variable speed, D.C. motor. A generator, mounted on the bed, supplies 230 volt, D.C., to the headstock motor.

Duplex Boring Machine

A HORIZONTAL boring machine provided with a substantial base upon which one or two self-contained heads may be mounted has been developed by Manning, Maxwell & Moore, Inc., Putnam Machine Works, Fitchburg, Mass.

The heads may be arranged with one or more spindles. Pick-off gears are provided, if desired, to vary the spindle speeds 25 per cent up or down from the normal speed. The gearing throughout is helical, with the exception

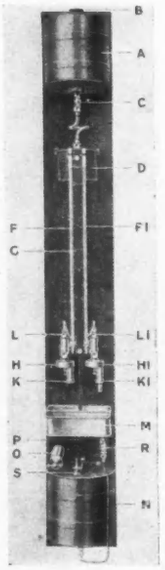


Duplex horizontal boring machine

of the pick-off gears, which are spur. The heads have a hydraulic feed which can be arranged for automatic or manual control. When controlled automatically they have a fast approach to the work. Feed then automatically starts and at the end of the feed movement the head automatically returns by fast traverse to the starting point and stops. The cycle is repeated by moving a single lever. The nature of work determines whether the saddles are controlled by one or two hydraulic cylinders and pumps. When a single hydraulic pump and cylinder are used, both heads move in unison. This is accomplished with a rack and pinion hook-up between them. The work may be carried on a jig or on the base, depending upon requirements.

B & B Calibrating Machine

AN instrument for calibrating carburetor nozzles, known as the Mark X jet-calibrating machine, is being manufactured by Amalgamated Carburetters, Ltd., of Birmingham, England. As illustrated herewith, the various parts of the instrument are mounted on a backboard which is firmly fixed in a vertical position. In use, gasoline passes from tank *A* through filter *B* and cock *C* to float chamber *D;* thence it passes through a tube to the body of the instrument, from which it rises in glass tubes *F* and F_1. The nozzle to be calibrated is placed in adapter *K* or K_1 and cock *H* or H_1 is turned on by rotating same. The air above the nozzle is released by means of screw *L* or L_1, and the level of gasoline in tube *F* or F_1 is read off on the scale *G*. Gasoline flowing from the nozzle is collected in tray *M*, from which it flows into tank *N*; it is returned to the top tank *A* through pipe *P* by working the pump *O* after cock *R* and the air release *S* have been closed.



Mark X nozzle-calibrating machine

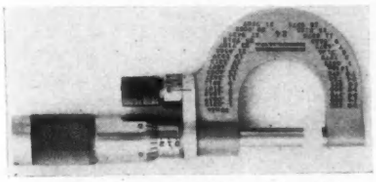
After a nozzle has been fixed in either of the adapters *K* or K_1 and the corresponding cock *H* or H_1 has been opened, the gasoline in the gage above it will fall to a level depending on the size of the nozzle, and it is this level which, when read off on scale *G*, gives the calibration of the nozzle. In the gage glass which is not in use the gasoline will remain practically at zero level. A master nozzle is provided with each instrument, which makes it possible to make corrections for barometric, temperature and density variations. This master noz-

Parts, Accessories and Production Tools

zle is inserted in one of the adapters and the gasoline is allowed to flow through it for at least one minute, and the mark on the scale which corresponds to the master nozzle size is set level with the height of gasoline in the glass tube when gasoline is being run through the master nozzle. It is recommended to adjust the scale several times a day as the temperature in the test room changes.

B & S Micrometer Caliper

AN entirely new principle of measuring to the ten-thousandth of an inch is employed in the Micrometer Caliper No. 24 recently announced by the Brown & Sharpe Mfg. Co. of Providence, R. I. This tool, with a range of from 0 to 1 in. by ten-thousandths, gives the ten-thousandth part of an inch directly.

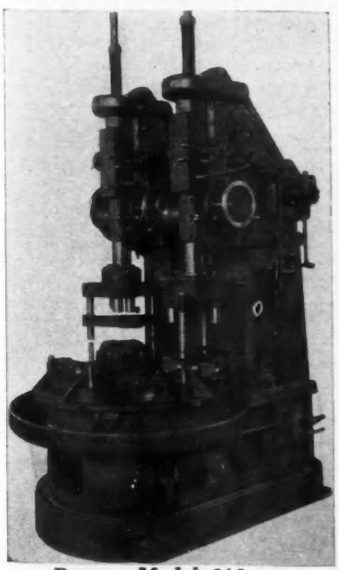


Micrometer Caliper No. 24

This new micrometer caliper is used and operated in much the same way as the conventional 1-in. micrometer. After the spindle has been brought up to the object to be measured, merely turn the small lower thimble until the horizontal line on the barrel of the micrometer coincides with a graduation on the main thimble. The graduation on the small lower thimble then tells the ten-thousandths of an inch to be added to the thousandths reading.

Production Gang Drill

EIGHT spur-geared quick-change feeds and a built-in hydraulically controlled rotating table feature the two-spindle Model 242 production gang drill recently placed on the market by the Barnes Drill Co., Rockford, Ill. Another improvement is the sweeper fastened to the under section of the rotating part of the table which pushes the chips around to the rear, where they drop into a steel pan. The throw of the multiple-disk clutches which control speeds and feeds is also hydraulically operated.



Barnes Model 242 production gang drill

The height of the machine is 120 in.; the floor space, 90 in. by 56 in. Total weight with motor is 9760 lb.

Steam Drop Hammer

THE Fiat Co. at Milano, Italy, has just installed a 24,000-lb. capacity steam drop hammer built by the Chambersburg Engineering Co., Chambersburg, Pa. The machine is similar to their new Type H, except that the guides are extra wide. It has a falling weight of 24,000 lb. The cylinder bore is 32 in., and the stroke is 52 in. The ram measures 66 in. from front to back.

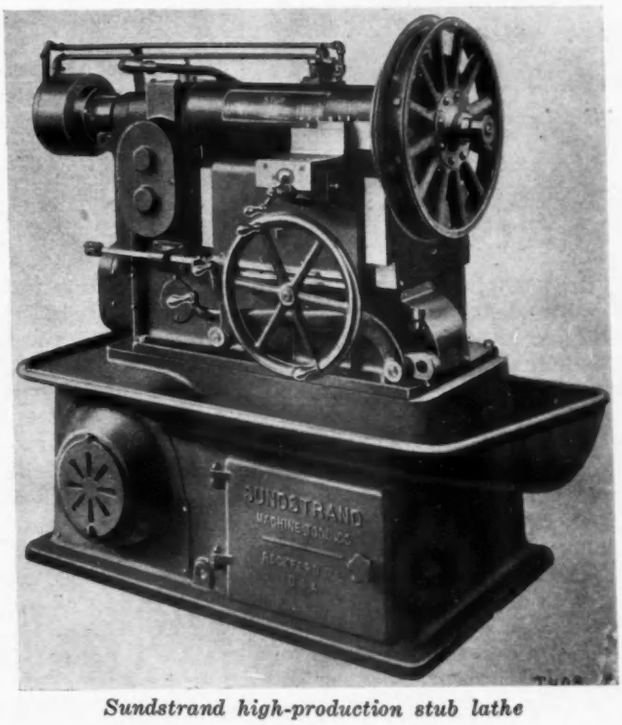
Chambersburg steam drop hammer

The overall height of the hammer from the bottom of its three-piece anvil to the top of the head is 34 ft. 10 in. From the floor line it is 24 ft. 4½ in.

The anvil is made in three sections to facilitate shipping, and has a total weight of 482,000 lb., of which the upper section weighs 220,000 lb. The total weight of the complete hammer is 662,000 lb.

Brake Drum Stub Lathe

A HIGH production stub lathe for turning automobile brake drums after they are attached to the wheel has been placed on the market by the Sundstrand Machine Tool Co., Rockford, Ill. This is an adaptation of



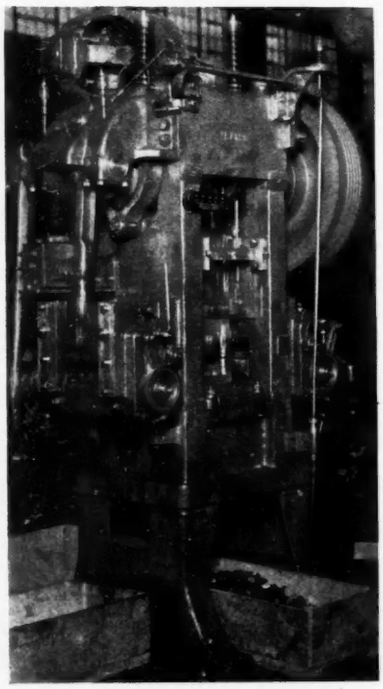
Sundstrand high-production stub lathe

the standard stub lathe effected by shortening the bed, lengthening the spindles and reversing the carriage feed. Front and rear tool carriages are provided for roughing and finishing cuts but the rear slide may be omitted when only one operation is required. This machine may also be used for turning unmounted drums.

To gain flexibility, this lathe is provided with 12 spindle speeds ranging from 40 to 260 r.p.m., and 10 feeds ranging from 0.005 in. to 0.046 in. Recommended motor installation is 5 to 7½ hp., 1800 r.p.m. Required floor space, 60 in. by 45½ in. Net weight, without motor, 3100 lb.

Bliss High Production Press

E. W. BLISS CO., Brooklyn, N. Y., has incorporated a number of improvements in the No. 630 press, which are said to make it particularly adaptable to high production work.



Bliss improved No. 630 press

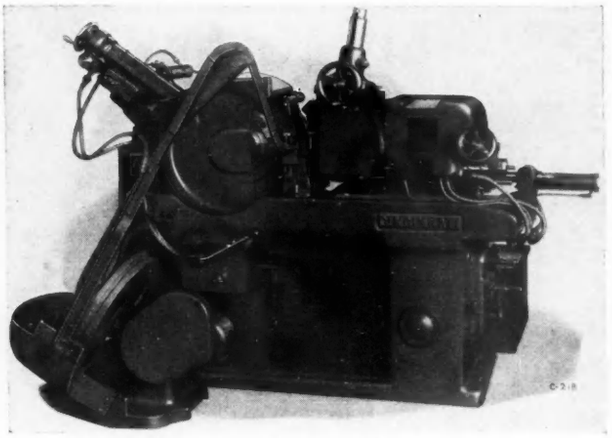
The size and weight of the bed, bolster plate and crown have been increased to provide the rigidity requisite to the life of dies. The double-roll feed is controlled by brakes, and close settings are now possible through the use of the independent roll relief and feed stroke adjustment. Manzell force feed lubrication, chrome-nickel steel rolling key clutch and pawl, and Texrope drive from the integrally mounted motor are additional features.

This press is rated at 30 tons and will operate at a maximum speed of 400 strokes per minute.

Floor Level Hopper

FULL automatic grinding on straight cylindrical work such as piston pins, small rollers, short shafts, bushings, etc., is obtained on Cincinnati Centerless Grinding Machines by using the newly developed floor level hopper recently announced by the Cincinnati Grinders, Inc., Cincinnati, Ohio.

This hopper is individually motor-driven. The variations in feed to suit the flow of work through the machine are obtained by means of a worm-and-wheel reduction connected to the rotated carrier disk. Work is dumped into the work basin and carried upward to a delivery chute by a series of studs which are mounted in a ring on the main carrier disk. The timing of the hopper is so adjusted that the delivery of the work is slightly in excess of machine requirements and a chute is provided to return the surplus work to the basin. The hopper can be easily disconnected and removed from the machine. It is adaptable to handling work through a series of consecutive machines, since the basin is low and gravity is utilized to carry the work from one machine to the basin of another.

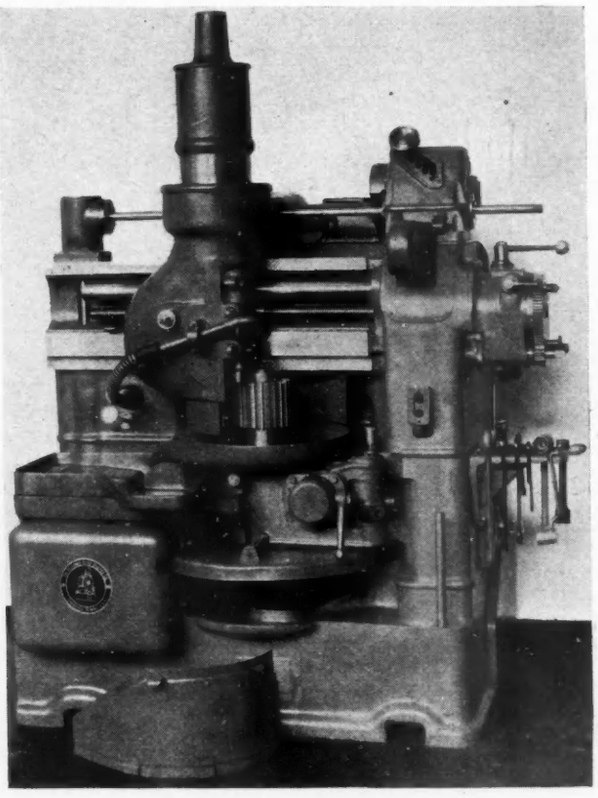


Cincinnati floor level hopper

Fellows Gear Shaper

NEW features designed to simplify the operation of the 6-A gear shaper are incorporated in the latest model of this machine built by the Fellows Gear Shaper Co., Springfield, Vt.

A simpler motor mounting, a bracket to hold wrenches and special tools, and a convenient means for cleaning the compound tank are among the new features listed. A major improvement is the installation of a friction disk clutch in conjunction with a single pulley drive

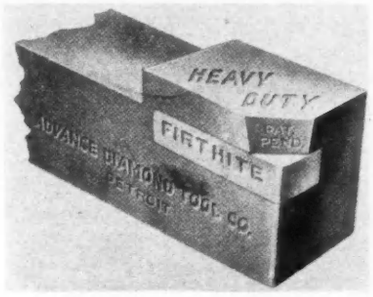


The 6-A Fellows gear shaper

controlled by a disk brake. The capacity of the machine remains the same, namely, 18 in. in pitch diameter and ¾ in. D.P., for both internal and external; 5-in. face, external, and 3-in. face, internal.

Tungsten-Carbide Mounting

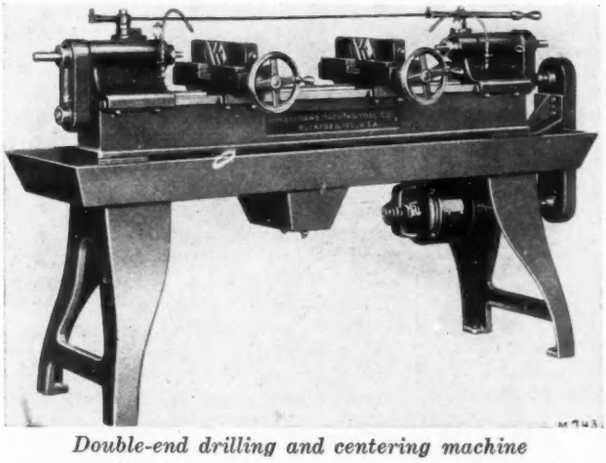
A DISTINCTIVE mounting for cemented tungsten-carbide tools is the "Bull-Dog" which has been developed by the Advance Diamond Tool Co., Detroit, Mich. The tip is inserted into a pocket in the shank and welded. This construction is said to provide complete protection for the tip, particularly the critical point at the top, where there is danger of breakage.



Bull-Dog cemented tungsten-carbide mounting

Drilling and Centering Machine

A NEW double-end drilling and centering machine with a work holding capacity of 4 in. round or hexagon stock is introduced by the Sundstrand Machine Tool Co., Rockford, Ill. The right-hand head and both vises are adjustable longitudinally along the bed. The spindles can be operated simultaneously or independently as desired. The spindle heads are of the quill type running in bronze bearings. The spindle nose is regularly arranged for mounting drill chucks.



Double-end drilling and centering machine

This machine is available in the following sizes, either belt or individual motor-driven: 4 by 12, 4 by 24, 4 by 36, 4 by 48, 4 by 60. Spindle speeds on the belt-driven machine, 750 and 1470 r.p.m. with the countershaft running at 1050 r.p.m., on the motor-driven machine 1022 r.p.m. with a motor speed of 1150 r.p.m.

Improved Milling Machines

CINCINNATI M-Type Millers, the Nos. 1 and 2 Plain, Universal and Vertical styles manufactured by The Cincinnati Milling Machine Co., Cincinnati, Ohio, are now equipped with power quick-traverse in six directions, up or down, in or out, left or right. The rates selected are 100 in. longitudinal, 66 in. cross and 33 in. vertical.

Feed in the same direction as the power quick-traverse is obtained by moving the feed lever into the downward or feed position. Twelve feeds are available: ¾ in. to 30 in. longitudinal, ½ in. to 20 in. cross and ¼ in. to 10 in. vertical, in both directions. Rear control of any one of the three feeds can also be obtained by the use of the rear reversing lever.

Alco-Tester

A GAGE known as the Alco-Tester, designed to determine the freezing point of automobile radiator fluids, irrespective of the temperature of the solution at the time of testing, has been developed by the Industrial Alcohol Institute.

The instrument comprises a thermometer and float, encased in a Pyrex glass tube. A scale read with reference to the thermometer level will give the freezing point of the solution. The test is simple and requires only a few moments. A wall chart shows how much alcohol must be added to insure complete protection against freezing at any given temperature.

Alco-Tester

Pneumatic Rotary Grinder

THE No. 88 Rotary grinder is the first of a line of pneumatic tools employing the rotary principle to be placed on the market by the Chicago Pneumatic Tool Co., New York, N. Y.

A series of four vanes rotate on a spindle in a casing having suitable openings for the admission and escape of compressed air. The efficiency of such a tool depends upon an even distribution of air upon the vanes rather than upon air pressure. The simplicity of construction reduces the weight appreciably and results in more power per pound of weight. The No. 88 is governor - controlled, non-vibrating and has a removable air strainer, heavy-duty radial and thrust ball bearing on the wheel end, and a renewable hardened rotor liner. The rotor is mounted on overcapacity ball bearings. There is an automatic oiler in the rotor housing with adequate grease plugs in the handle and gear case ends.

No. 88 Rotary Grinder with pistol grip

No. 88-S with a straight grip is 22½ in. long and weighs 15¾ lb. No. 88-P with pistol grip is 21 in. long and weighs 16¼ lb.

INCREASING numbers of Parisian motorists are said to have acquired the habit of "hocking" their car during the winter months and the Paris municipal pawnshop, the Mont-de-Piete, has been compelled to erect a garage for 2000 cars.

First with the News

Reliable, Accurate

News of the Industry

PAGE 844 VOLUME 61 *Philadelphia, Saturday, December 7, 1929* NUMBER 23

Waning Production Eases Car Stock Inventories

PHILADELPHIA, Dec. 7—The automotive industry has entered the final month of the year with curtailed schedules still in force, considering the factories of the United States and Canada, as a whole. From present indications it would appear that the total production for the year will not show any great excess over the 5,600,000 units set down as a conservative estimate several weeks ago. The present modest level of activity in the industry is looked upon with favor in numerous quarters where large stocks of new and used cars are considered a major problem.

Sales executives are watching the retail market throughout the country vigilantly and care is being taken by factories in keeping shipments to dealers commensurate with the demand.

It is believed generally that the first quarter of 1930 may show an aggregate production rather below that of the corresponding period during the record-breaking 1929. There is no evidence of doubt, however, to be found at the moment that the annual national shows will stimulate the ever-present public interest in automobiles to a great extent and will pave the way for a distinctly successful greater selling season for 1930.

Automobile finance companies indicate that there has been a seasonal decline in new retail paper purchased but none of them indicate any loss further than that anticipated as normal declines for this season. In fact most of them are optimistic as to the future of sales in the automotive industry.

Miniger Chosen Director of Libbey-Owens Glass

TOLEDO, Dec. 4—C. O. Miniger, president of Electric Auto-Lite Co., was elected a director of the Libbey-Owens Glass Co. here today. The Graham brothers are heavily interested in this company, which is now enlarging its plant for production of laminated and polished plate glass.

This is the first indication that Miniger interests have had any connection with the Toledo glass industry.

Through control of the Bicheroux process for plate casting in the United States, the Libbey-Owens group is associated with National Plate Glass Co., General Motors subsidiary; Edward Ford Plate Glass Co., of Toledo, and the Blue Ridge Glass Corp., a Corning interest.

Canadians Abandon National Show Plans

TORONTO, Dec. 5—The National Motor Show of Canada, which was to be held in the automotive palace on the Canadian National Exhibition grounds, beginning Jan. 11, has been abandoned, according to an announcement made here. The decision not to hold the show is understood to be the result of difficulties which arose over the allocation of space for exhibition. Exhibitions scheduled for Ottawa and Montreal will go ahead as usual, according to the latest information.

To Show Cadillac "V-16"

DETROIT, Dec. 7—The new 16-cylinder car by Cadillac and General Motors will be given a preannouncement showing at the National Automobile Shows beginning with the Thirtieth Annual Automobile Show in New York City, opening Jan. 4. The car will be called the "Cadillac V-16." The car has been in process of development by Cadillac engineers and designers for more than three years, according to announcement.

New Ford Plane Announced

DEARBORN, MICH., Dec. 4—A new tri-motored, all-metal transport airplane to be known as the 7-AT type has been announced by the Ford Motor Co. The most essential difference in the latest addition to the Ford air transport line is the substitution of two Wright J-6 motors of 300 hp. each for two of the three Pratt & Whitney Wasps, which power the 5-AT.

Ford Increases Pay of All Employees

Minimum Wage Raised from $6 a Day to $7, Officials Say

DETROIT, Dec. 3—Wage increases effective yesterday and affecting every Ford employee in the United States and Canada were announced today in statements issued simultaneously by Edsel B. Ford, president of the Ford Motor Co., and by Wallace R. Campbell, president of Ford Motor Co. of Canada, Ltd. The minimum wage was increased from six to seven dollars a day by both the domestic and the Canadian company. All employees whose wage rates exceed the minimum received increases in their hourly rates. The probationary or hiring-in wage paid to apprentices for the first two months was raised from five to six dollars a day. In addition the salary roll in both the domestic and Canadian companies was raised five per cent.

According to Mr. Ford's statement, the monthly increase effected by the domestic company will amount to $1,628,451 a month or slightly more than $19,500,000 yearly. On the basis of the October payrolls which registered 144,990 employees throughout the United States. The increase effected by the Canadian Company will amount to approximately $1,000,000 yearly on the basis of the average payroll.

"Employees raised from six dollars to seven dollars a day number 24,320 on the basis of the October payroll," says Mr. Ford's statement.

"Employees to the number of 113,643 have received increases which bring their daily wage between $7.20 and $10 a day. Of this number 27,410 men go to $7.20 a day; 33,396 men go to $7.60 a day; 22,971 go to $8 a day and 12,327 go to $8.40 a day. Between that rate and $10 a day, 17,539 are affected."

In a subsequent statement Mr. Ford said, "We are able to make this wage increase partly because of anticipated economies and the long volume of production which we have had over a period of months and partly because of our excellent outlook for next year." Mr. Ford said that there would be no increase in the prices of the Model A and that included the "improved Model A" not yet announced.

Wage Advance Hangs on Basic Economy

No Suggestion of Cutting Present Rates, Macauley Tells Conference

WASHINGTON, Dec. 5—"Whether wages be expected to continue to advance in the automotive industry as in the past, will depend upon the economic conditions. There has been no suggestion that they are too high or that they should be reduced," Alvin Macauley, president of the N.A.C.C., today told the National Business Survey Conference, held in Washington at the call of the United States Chamber of Commerce.

As regards the effect of the recent stock market decline on the automobile business, Mr. Macauley said that leaders of the industry were watchful but are not concerned about the outcome. Time and again, he pointed out, the automobile industry "has seemed to respond to the fluctuation of general business but always has been among the first to come back and begin to climb to new records of prosperity."

J. R. Histead, vice-president of the National Automobile Dealers Association, brought to the conference a report in which he stated, "Since Nov. 1, all manufacturing operations have been so curtailed that, except for the operation of one producer, there is no excess now being fed into the hands of retailers.

"In any consideration of the national automobile picture," he pointed out, "it should be remembered that we now have reached the stage where the maintenance of 25,000,000 vehicles on the road is a much larger economic consideration than the sale of any certain number of cars in any certain number of months."

The purpose of the conference, as stated by President Hoover in his address at the opening of the session, was "to create a temporary organization for the purpose of systematically spreading into industry as a whole, the measures which have been taken by some of our leading industries to coun-

(Continued on page 848)

Financial Notes

Company	Remarks
Amer. Car & Fdy. Co.	reg. quar. div. $1.50 on com. and $1.75 on pref. stock
Autocar Co.	quar. div. at rate of 8% per year on pref. stock
Budd Wheel Co.	net profit 9 mos. end. Sept. 30, $1,676,695 after all charges, equivalent to $7.06 on outstanding com. stock, after pref. div.
Chicago Pneumatic Tool Co.	reg. quar. div. 87½c on pref. stock
Chrysler Corp. of Can.	earnings 9 mos. $24,730,419 after taxes; compares with $21,786,276 for same period 1928.
Curtiss Airplane & Motor Co.	declared increased div. of 50c
Doehler Die Casting Co.	reg. quar. div. 87½c on 7% pref. and $1.75 on $7 pref.
Eaton Axle Co.	reg. quar. div. 75c
Electric Auto-Lite	reg. quar. div. $1.50 on com. and $1.75 on pref. stock
Federal Mogul	reg. quar. div. 30c payable Jan. 2 to rec. Dec. 14
Federal Motor Truck Co.	reg. quar. div. 20c
Goodyear Tire & Rubber Co.	reg. quar. div. $1.25
Hoskins Mfg. Co.	reg. quar. div. 60c. Extra div. 60c. Both payable Dec. 31 to rec. Dec. 15
Johns-Manville Co.	reg. quar. div. 75c on com. and $1.75 on pref. stock
L. A. Young Spring & Wire Corp.	reg. quar. div. 75c
L. F. Serrick, Inc., Toledo	applied for charter to manufacture screw machine parts
Mack Trucks, Inc.	secured listing N. Y. Stock Exch. of 7695 shares no par com. stock
Muskegon Piston Ring Co.	resumed quar. div. of 75c. Extra div. 10c
Peerless Motor Car Co.	net loss for 9 mos. end. Sept. 30 of $2,164,127; compares with net loss for same period 1928 of $937,205
Perfect Circle Co.	net income 10 mos. $5.16 a share after chgs. incl. taxes, as compared with $4.76 a share for entire 1929
Pratt & Lambert, Inc.	reg. div. $1.00 and extra div. $1.00 a share on com.
Timken Detroit Axle Co.	reg. quar. div. 15c and extra div. 5c
United Aircraft & Transp. Corp.	net 3rd quar. earnings $2.658,331 after all charges, incl. pref. dividends.
Willys-Overland	3rd quar. earnings $119,381, as compared with $2,146,585 same period 1928
Wright Aero. Corp.	net earnings for 9 mos. ended Sept. 30, $1,653,828, or $2.75 a share, as compared with $1,922,130, or $6.64 a share, on stock outstanding at end of same period 1928. Third quar. earnings $299,331, compared with $899,253 for corresp. quar. 1928

November Car Sales Lower Than October

PHILADELPHIA, Dec. 5—Sales reports from the major distribution points in the United States show a drop in new car deliveries of from 8 to 50 per cent for November as compared with October sales.

Used cars sales show a gain in only Chicago and San Francisco, other centers showing a recession of from 10 to 50 per cent. The Minneapolis territory, according to the report, shows a 50 per cent drop in both new car and used car sales. Chicago shows a decline of 10 per cent in new car sales, but an increase of 10 per cent in used car sales.

As compared with October, new and used car stocks are higher in almost all parts of the country. Cars selling for $1,000 were moving at a fair rate as far as sales were concerned compared with October, but the medium-priced and high-priced brackets showed considerable recession.

The stock market crash of November was reported as the most serious influence on sales, showing a resulting in a marked decline in most of the centers from which reports were received. Reports from New York, New Orleans and Boston minimized this factor, however. The new excise tax and the increased insurance rates in Massachusetts, poor cotton crops in Texas, wheat being held by farmers in the Ninth Federal Reserve area (Minneapolis) and continuous rains in southern Ohio affected sales.

The outlook for 1930 is rather depressing on the whole from the viewpoint of eastern dealers, but those west of the Mississippi seem to think that next year will see more profits. Some reports indicate that dealers do not expect to be crowded by factories next year, and that there will be fewer sales but less wild trading in used cars and consequently more profits.

Automotive Industries Sales Report for November, 1929

	New York	Boston	Philadelphia	Chicago	St. Louis	Cincinnati	Detroit	Minneapolis	Denver	Milwaukee	Dallas	New Orleans	San Francisco	Seattle	Portland
New Car Sales	−27%	−9%	−15%	−10%	−5%	−35%	−50%	−50%	−10%	−15%	−8%	−25%	−25%	−10%	−10%
New Car Stocks	G	F	F	F	F	G	G	G	G	G	G	F	F	G	G
Used Car Sales	F	−10%	−10%	+10%	−12%	−29%	P	−50%	−20%	−10%	−10%	P	+25%	−15%	−25%
Used Car Stocks	G	G	G	−20%	G	G	G	G	G	G	G	F	F	F	G
Low-Price Group (Under $1,000) Sales	F	F	F	F	F	G	F	G	G	F	G	P	F	G	P
Medium-Price Group ($1,000 to $2,000) Sales	P	F	P	F	F	F	P	F	F	P	F	P	F	F	P
High-Price Group (Over $2,000) Sales	F	G	F	P	P	P	F	F	P	P	P	F	F	F	P

Key: Percentages and data shown as compared with October, 1929. G—good or surplus; F—fair; P—low.

Men of the Industry and What They Are Doing

To Visit National Shows

Among arrivals in this country to attend International Day at the shows in January are the following representatives of the automotive industry in various foreign countries:

J. V. Mager, representative of bus transportation lines in Czechoslovakia, is now here making a study of the more important lines in this country.

Amleto Lampignani, general manager of the Bianchi Automobile Co. of Milan, Italy, who has been attending the National Machine Tool Congress at Cleveland, is now visiting a number of automobile plants in the Middle West.

Karlis Krieves, former minister of communications of the Latvian Government, has been making a special survey of motor transportation and coordination of rail and motor traffic.

Messrs. Mimra, Bittmann and Czyptschirsch, engineers of the Tatra Motor Works of Czechoslovakia, have come over and are studying modern transportation methods and machinery in this country.

D. R. Onrubia, who is on the staff of the Manila Railroad Co. of the Philippine Islands, is making a study of motorbus transportation and the coordination of motor bus, truck and rail transportation.

W. Ostwald, editor of a number of automobile magazines in Germany, is studying American methods of motor taxation and highway finance.

William Boeckl, highway authority of Austria, is here to obtain the most recent data regarding the construction of concrete and other types of highways.

T. Watanabe, director, and **K. Inayoshi,** chief engineer of the Nippon Asbestos Co. of Tokyo, are here studying the use of asbestos brake lining in American motor cars.

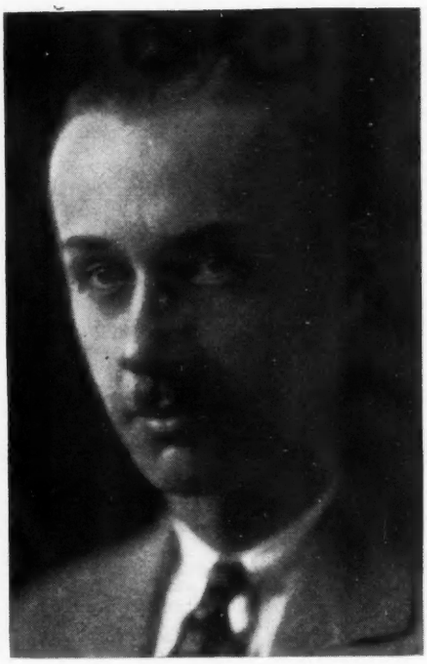
J. E. Tuokkola, former president of the Finnish Automobile Dealers Association, at present director of traffic in that country, is also here studying American roads.

Perfex Appoints Tambert

Announcement has been made by D. T. McLeod, president of the Perfex Corp., Milwaukee, manufacturer of radiators for gasoline engines, that **John W. Tambert** has been named secretary and treasurer to fill the vacancy caused by the resignation of **C. G. Phelps.** Mr. Tambert formerly was in charge of the cost and manufacturing departments.

Stolper Sells Company

Charles Stolper has disposed of the Charles Stolper Cooperage Co., Milwaukee, in order to devote his time entirely to the Stolper Steel Products Co., manufacturing steel stampings for the automobile, truck and tractor industries.



Nicholas Moore

whose appointment as advertising manager of the Marmon Motor Car Co. was announced in AUTOMOTIVE INDUSTRIES *last week*

G.M. Executives Move

Among recent movements of General Motors Export Co.'s executives was the sailing of **E. K. Wild,** formerly assistant general service manager of the Export Division for Alexandria, Egypt, where he will assume new duties as managing director of General Motors Near East.

T. G. Eybye, formerly sales manager of General Motors Japan, Ltd., also sailed recently to assume new duties as sales manager for General Motors Peninsular at Madrid. Mr. Eybye was accompanied by Mrs. Eybye.

Jones is Promoted

The appointment of **E. E. Jones** as zone manager of Oldsmobile Six and Viking Eight activities in the Cincinnati zone is announced by D. S. Eddins, vice-president and general sales manager of Olds Motor Works. For several months past Mr. Jones has been assistant zone manager at Boston.

Vail Returns From Europe

E. L. Vail, vice-president of the Jaeger Watch Co., Inc., of New York, who returned recently from a trip abroad, states that he finds the automobile and aircraft industry of Europe on a firm and progressing basis.

Prins Goes to Japan

P. J. Prins, a member of the export division of the Firestone Tire & Rubber Co. for the past year, sailed recently for Japan, where he will represent the company.

Segrave to Race Boat

Major Sir Henry O. D. Segrave, conqueror of Commodore Gar Wood's Miss America VII, at Miami Beach and Lido, Italy, and holder of the world's automobile speed record of 231.362 m.p.h., will be a participant in Detroit's 14th annual international regatta. Major Segrave will come to Detroit next fall for the regatta, Aug. 29 to Sept. 2, to participate in a new international class and will bring two boats for the affair. Secretary J. Lee Barrett, of the Yachtsmen's Association of America, who has just returned from Europe, reports that he will also bring a boat to compete for the British International Trophy, but to date the famous English speed merchant has not committed himself by officially challenging for the world's championship speed boat trophy.

Inspect D.A.C. Plant

R. Arisaka of the Kawanishi Machine Works, Kobe, Japan, was recently a guest of the Detroit Aircraft Corp., in his investigation carried on for the Nippon Keori Kaisha, Ltd., who are seeking the manufacturing rights for Japan for American aircraft. Other recent visitors were **General Manuel T. Quinones** and **Captain Benjamin Mendes** of the Colombian Air Ministry, who are now making an investigation for Colombia, S. A.

Greenberger Succeeds Balliet

John M. Balliet has resigned as president of the Appleton Steel Tubes Co., Appleton, Wis., because of ill health, and **Milton Greenberger,** president of the Steel Mills Products Co., Chicago, has been elected to succeed him. **R. M. Kanik,** president of the Moloch Foundry & Stoker Co., Kaukauna, Wis., has been elected a director of the Appleton company.

Sivright Joins Hart-Parr

Cal Sivright, Minneapolis, Minn., general manager of the Minnesota State Fair, and the Northwest Automobile Show in 1928, left Dec. 1 to become manager of the Hart-Parr Co., Charles City, Iowa. He has been with the fair 16 years as head of the machinery show and publicity department, and formerly headed the Stockland Road Machinery Co.

Heil Appoints Maurer

C. N. Maurer, for ten years associated with the Wisconsin State Highway Commission, has resigned as state traffic engineer to become associated with the Heil Co., Milwaukee, as sales promotion manager. The Heil Co. manufactures tank and dump body equipment for motor trucks, hydraulic hoists, highway snow plows, etc.

Peerless to Spend $500,000 on Plant

New Production Equipment to be Installed, Bohannon Says

CLEVELAND, Dec. 2—James A. Bohannon, president of the Peerless Motor Car Corp., stated today that his company had plans well under way for the complete modernizing of plant and equipment, the cost of which will exceed $500,000. The most important part of improvement program is the installation of equipment for straight-line production, and these new facilities will be ready for operation in December. The first official report of the plans and policies of the new management which assumed control of the company's affairs in July was mailed to the stockholders last Tuesday, Mr. Bohannon added.

The company has changed its fiscal year to start Oct. 1, and the report contains the result of a complete audit of the company's assets and liabilities as of Sept. 30. On this date the company had cash and receivables of $1,500,000 and total current assets of $3,147,698, compared with trade liabilities and accrued items of $768,937.

"Our plans for 1930 call for no large increase in production, but with greater plant and operating efficiency we expect an improved showing," said Mr. Bohannon. "The automotive industry has been subject to seasonal fluctuations, but over a period of years has shown an unequalled record of growth."

Included in Mr. Bohannon's report to the stockholders of the Peerless company was a statement that the company is experimenting with three types of eight-in line engines.

Dornier Predicts Planes Twice as Large as DO-X

NEW YORK, Dec. 2—Airplanes two to three times as large as the huge Dornier DO-X, which flew with 169 passengers over Lake Constance, are not only feasible but structurally less difficult than the transport airplanes now being built. This is the opinion of Dr. Claude Dornier, designer and builder of the world's largest airplane. Dr. Dornier arrived in New York recently to confer with executives of General Motors and Fokker Aircraft Corp. regarding the construction of his flying boats in America.

"It will be easier to build a larger boat than it was to construct the DO-X," said the famous designer in a talk with aviation experts soon after his arrival.

Acme Creditors to Meet

DETROIT, Dec. 4—Creditors of the Acme Motor Truck Co. of Cadillac, Mich., which is in receivership, are to meet today at Grand Rapids, Mich., at which time they will be asked to present before the United States Court reasons why the company's properties should not be sold, as already petitioned. The Michigan Trust Co., Grand Rapids, and L. C. Klesner, formerly general manager of the Acme company, are coreceivers.

Seek Uniform Air Traffic Code

WASHINGTON, Dec. 3—Airport managers and engineers, aircraft operators and all others interested in the industry are being invited to contribute suggestions on air traffic control to a committee appointed to draft a standard signal system, the director of the Department of Commerce's aeronautical development service, Col. Harry H. Blee, stated Nov. 30.

Durkopp Works End Automobile Output

BERLIN, Nov. 20 *(Special)*—The Durkopp Works of Bielefeld in Germany have just announced their intention of giving up altogether the manufacture of automobiles. The company was founded in 1867 as a general engineering concern and later took up the manufacture of passenger cars and trucks.

In recent years the production of passenger cars was given up and efforts in the automotive division of the works, which also make bicycles and sewing machines, were concentrated on the manufacture of trucks and buses. At the last motor show at Berlin, held in November, 1927, a new six-wheeler was shown.

Lately only a few men have been employed in the automobile works, which are now to be closed down. It is intended to reorganize them for the production of a new textile machine. The Durkopp Works also have their own foundry in which they will in the future also carry out jobs for other companies. Also spare parts for the Durkopp vehicles on the road will continue to be produced.

Makers that have ceased working this year are, among others: Mannesmann-Mulag, Mannesmann Automobilwerke, and Elite-Diamant.

Firestone Enlarging Plant

LOS ANGELES, Dec. 2—Firestone Tire and Rubber Co. is enlarging its Los Angeles factory by the addition of $3,000,000 in new units, which officials state will make the plant the largest tire factory west of Akron, with a capacity of 15,000 tires and 17,500 tubes daily.

The $3,000,000 addition, to be completed within two months, comes within a year after the opening of the original $7,000,000 plant here. J. W. Thomas, executive vice-president, and Russel A. Firestone, vice-president of the California Firestone organization, are in Los Angeles completing arrangements for the final details of the enlarged plant.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

NEW YORK, Dec. 5—The cold weather throughout the country last week naturally stimulated the sales of winter goods, especially clothing. It is now freely admitted, however, that business in general has slackened and is below last year's level.

RETAIL SALES

Retail sales throughout the country during October were three per cent above those in the corresponding period last year, while wholesale sales were 2.7 per cent above those a year ago, according to a report just issued by the Federal Reserve Board.

DEPARTMENT STORE SALES

Sales of department stores in the New York Federal Reserve district, according to the Federal Reserve Bank of New York, increased during October, especially in New York, where there was an increase of eight per cent above those a year ago. A preliminary inquiry indicates that sales of New York City department stores during the first half of November averaged about six per cent below those a year ago.

RADIO EQUIPMENT SALES

Sales of radio equipment during the first three quarters of the year amounted to $360,897,207, or 14 per cent above those a year ago. Furthermore, it is estimated that 40 per cent of the industry's sales are made during the last quarter of the year.

FREIGHT CAR LOADINGS

Railway freight loadings during the week ended Nov. 16 totaled 983,323 cars, which marks a decrease of 72,797 cars below those in the corresponding week last year but an increase of 15,271 cars above those in the corresponding week two years ago.

FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices for the week ended Nov. 30 stood at 92.3, as compared with 92.2 a week earlier and 92.6 two weeks earlier.

BANK DEBITS

Bank debits to individual accounts outside of New York City for the week ended Nov. 27 were three per cent below those in the corresponding week last year.

FEDERAL RESERVE STATEMENT

The consolidated statement of the Federal Reserve banks for the week ended Nov. 27 showed an increase of $12,800,000 in holdings of discounted bills, while there were decreases of $26,500,000 in holdings of bills bought in the open market, of $400,000 in holdings of Government securities, and of $142,600,000 in member bank reserve deposits. The reserve ratio on Nov. 27 was 71.8 per cent, as against 71.2 per cent a week earlier and 69.5 per cent two weeks earlier.

Steel Mill Output Far Below Capacity

Dull Markets Rule and Backlogs Are Virtually Non-Existent

NEW YORK, Dec. 5—Steel-finishing mills are operating at what is generally looked upon as the irreducible minimum, full-finished automobile sheet specialists being down to about two-fifths of capacity and some of the strip mills being unable to keep much more than a third of theirs engaged. Virtually every pound of steel now being turned out is for immediate shipment. There are unconfirmed reports that some sales of sheet bars have been made at $1 per ton under the market, which is supposed to be $35.

There is very little doubt that sheet bar producers would be willing to shade the price, if by doing so they could improve their rate of operations, but they fear the effect of concessions to non-integrated sheet rollers on the market for finished sheets. Nearly all of the mills marketing semi-finished steel are also producers of finished descriptions, and therefore unwilling to disturb the market for the latter.

The market for billets and slabs is more nearly $34 than $35. There has been no change in sheet or strip prices. As for the market's tone, the only statement that can be made without fear of contradiction is that it is extremely dull and restricted. In some quarters it is characterized as firm, but this is largely based on the fact that a few bargain hunters failed to secure concessions. The tonnages involved were so slight, however, that the aloofness of sellers in these few isolated cases hardly justifies such a conclusion. Prices hold largely for the want of sufficient business to subject them to a real test. Demand for automotive alloy steels is dormant.

Pig Iron—Some of the Middle West automotive foundries are reported to have ordered moderate-sized tonnages shipped to them. Small first quarter 1930 transactions at current quotations have taken place. The price for malleable and No. 2 foundry remains unchanged at $20, base, Detroit furnace, and $19, base, Cleveland furnace. The Valley market is stagnant at $18.50 for foundry, f.o.b. furnace.

Aluminum—Automotive consumers show little disposition to anticipate their next year's requirements any more than is absolutely necessary, continuing to confine their takings to immediate requirements. Some good-sized transactions are in process of negotiation, however, with prices generally unchanged from prevailing levels.

Copper—Consuming demand is very light. The American copper industry is beginning to feel the effect of the campaign being carried on in European countries, especially in France, to substitute aluminum, wherever possible, for copper. In the "outside" market, electrolytic is quoted one-half cent under the producers' price.

Tin—The market turned extremely weak in London early this week, new low levels being cabled. The market here is unsettled, with some spot Straits selling early in the week at below thirty-nine cents.

Lead—Quiet and unchanged.

Zinc—Quotations are easy amid moderate consuming demand.

YOUNGSTOWN, Dec. 2—Primary and secondary steel interests of this district are undeterred by the current lull in new business and plan broad expansion programs for next year.

Carnegie Steel will expend several millions in installing a new 10-in. bar mill at its MacDonald plant and enlarging the capacity of its 12-in. mill at the Upper Union plant. The addition to the MacDonald plant will give that group a total of 11 mills.

President Elmer T. McCleary advises that Republic Steel is engaged in a $9,000,000 program which will not be curtailed in any degree. It benefits plants of the company at Youngstown, Warren, Niles, and Birmingham, Ala.

The Youngstown Sheet & Tube Co. brings to completion in 1930 a $27,000,000 program chiefly benefiting properties in the Chicago area. Sharon Steel Hoop's program for next year calls for departmental changes only, as strip mills were completed this year.

At Warren, Youngstown Pressed Steel Co., principal subsidiary interests of the Sharon Steel Hoop, has started construction of a vitreous enameling plant to cost $500,000. Tuscan Steel has begun departmental changes and improvements which will involve $300,000.

Colin Campbell Resigns; No Successor Appointed

TOLEDO, Dec. 3—Colin Campbell, vice-president in charge of sales of the Willys-Overland Co. since March, 1928, resigned today due to protracted ill-health and the need for a long rest. He will spend several months in Florida. Mr. Campbell was seized with a serious heart attack on board a Detroit-Buffalo boat last August.

L. A. Miller, president of the Willys-Overland Co., announced that no successor to Mr. Campbell would be appointed, but that the sales department would continue to function under the direction of Nelson A. Beardsley, eastern general sales manager, and Harry C. Gartley, western general sales manager.

Champion Field Men Meet

TOLEDO, Dec. 3—Plans for a greater sales campaign in 1930 were outlined by R. A. Stranahan, president of the Champion Spark Plug Co., in welcoming 170 field representatives of the company to Toledo today. Delegates to the convention studied factory processes with O. C. Rhode, chief of the technical staff. Factory conferences are to be continued Wednesday and Thursday. F. E. Southard, advertising manager, will discuss the company's advertising program for 1930.

Milwaukee Buys Site

MILWAUKEE, Dec. 2—The Milwaukee Die Casting Co. has purchased a four-acre tract as a new plant site. It is probable that construction will begin early in 1930.

Loughead Aircraft Organized in West

McAdoo is on Board of Pacific Coast Company Organized By Aero Pioneers

LOS ANGELES, Dec. 4 — The Loughead Bros. Aircraft Corp., Ltd., has received a permit from the state corporation commissioner to manufacture airplanes. The new company will have an authorized issuance of 207,500 shares of Class "B" and 1,000,000 shares of Class "A" no par value stock.

The tentative list of officers and directors includes William G. McAdoo, J. L. Maddux, Allan and Malcolm Loughead, Fulton G. Hoge, G. Sadler, Ray Acre, Edward F. Andrews, Lawrence W. Scudder and Earle P. Halliburton.

Allan Loughead, who designed the Lockheed plane and was connected with the Lockheed Aircraft Co. until it was merged with the Detroit Aircraft Corp., will be president. He and his brother, Malcolm, who developed the Lockheed hydraulic brake, Mr. Acre and Mr. Andrews, all of whom are pioneer aviation engineers, have been active in organizing the new company and preparing for the development of a new plane.

Development work is being conducted in a factory at Glendale at present, but a site on an airport is planned later.

Business Leaders Confer

(Continued from page 845)

Secretary of Commerce Robert P. Lamont, addressed the conference following President Hoover, and William Butterworth, president of the Chamber of Commerce of the United States, presided.

Representatives of a number of key industries presented reports during the afternoon. A committee of approximately 60 industrial leaders was appointed at the end of the session to work out plans for carrying out the purpose of the conference.

Among other leaders in the automotive industry who attended the conference were: Frank A. Seiberling, president, and A. L. Viles, manager, Rubber Manufacturers' Association, Inc.; John J. Raskob and H. H. Rice, General Motors Corp.; A. J. Brosseau, chairman, truck committee, and Alfred Reeves, general manager of N.A.C.C.; John M. McComb, president, and M. L. Heminway, general manager, M.E.A.; Lamont duPont, Wilmington, Del.; Andrew C. Pearson, National Publishers' Association; Norman G. Shidle, vice-president, National Conference of Business Paper Publishers, and directing editor, Chilton Class Journal Co.; C. C. Hanch, general manager, National Association of Finance Companies; Roy D. Chapin, chairman, Hudson Motor Car Co.; Charles Piez, chairman, Link-Belt Corp., and John G. Williams, National Association of Taxicab Owners.

Czechoslovak Car Makers Plan Joint Operations

PHILADELPHIA, Dec. 3 — The negotiations for the cooperation of three leading Czechoslovak engineering concerns—the Skoda Works, the Ceskomoravska Engineering Co., and the Brno Small Arms Co.—have recently been resumed, according to the *Central European Observer*, and according to information given to the press by M. Ruzicka, the newly appointed general manager of the Ceskomoravska concern, the discussions are well advanced.

The cooperation will be general, but a special agreement will be made in respect of automobile output. In this direction it is proposed to establish a joint factory for the manufacture of automobile accessories, to make the three concerns independent of imports of these necessaries (including pneumatic tires). Further, the three concerns will join together in making their purchases of raw materials and semi-finished goods. They will also support one another in selling their cars abroad, though this cooperation is not to include a joint scale of prices.

Stock Decline Reviewed

NEW YORK, Dec. 2—Seven representative motor stocks showed a decline of 51.7 per cent in aggregate value during the period from Aug. 30 to Nov. 13, according to Frazier, Jelke & Co., New York banking house. This decline compares with a 44.3 per cent decrease during the period for 100 representative stocks taken from various classifications. This decline was exceeded by amusements, which lost 62.3 per cent, electrical shares 58.1 per cent, merchandising 53.1 per cent and utilities 52.9 per cent. Industries which show a smaller decline than motors include chemicals, railroad equipment, oils and rails. In the subsequent recovery during the period from Nov. 13 to the end of the month motor stocks showed an improvement of 12.9, an aggregate value out of a total recovery for the 100 representative stocks chosen of 11½ per cent.

Highway Aid Apportioned

WASHINGTON, Dec. 2—Responding to President Hoover's suggestion that public building programs be speeded up and prudently expanded to promote business and prevent unemployment, Secretary of Agriculture Arthur M. Hyde today apportioned among the 48 states and Hawaii $73,125,000 authorized by Congress as Federal aid for road construction in the fiscal year 1931. The Secretary announced that the state highway departments will be authorized to proceed immediately with preparations for the expenditure of the newly apportioned funds during the next construction season.

Sterling Deliveries Gain

MILWAUKEE, Dec. 4—The Sterling Motor Truck Co. made a gain of 48 per cent in deliveries in the fiscal year ended Oct. 31 over the previous year, it is announced. Total number of units delivered were 1834, compared with 1236, an increase of 598. October, 1929, was the largest month of the year for Sterling.

Kenworth Revises Line

SEATTLE, Dec. 3 — The Kenworth Motor Truck Corp., Seattle, besides revising its entire line is offering a new one-ton truck, Model BS. The new model lists at $1,375 and is equipped with a six-cylinder 3⅜ by 4½ in. Continental 18E engine mounted in unit with a Brown-Lipe clutch and three-speed Brown-Lipe transmission, Zenith carburetor, Auto-Lite starting, lighting and ignition equipment, a semi-floating spiral bevel Clark rear axle having a ratio of 5.12 to 1, and Ross steering gear.

The other new models are replacements and consist mostly of changes in wheelbase, engine size, electrical system, transmission and rear axles. New models and replacements are as follows: Model 100 replaces Model 45 in the 1½-ton class; Model 125 replaces 55 in the 2-ton class; Model 145 in place of DH in the 2½-ton size and Models 184 and 185 replace Models G and J in the 3-ton classification. The company has also added a 10-ton six-wheeler, Model 345, and a 10-ton tractor truck, Model NT, to its present line.

Continental Holders Increase

DETROIT, Dec. 2—"More and more have the careful people of the nation come to regard the going units of the automotive industry an attractive and safe investment," says R. W. Judson, president of the Continental Motors Corp.

"By this I do not mean from the speculative angle, but purely as a means of making savings earn money for them. A concrete evidence of this is the remarkable increase in the number of stockholders in the Continental Motors Corp., which amounted to more than 100 per cent in one year. In October, 1928, there were 11,336 stockholders in this corporation. On Oct. 31, 1929, this number is reported to have grown to 23,750.

Austin Awards Contract

TOLEDO, Dec. 3—Contracts for the starting, lighting and ignition equipment for the American Austin car, to be manufactured at Butler, Pa., by the American Austin Co., have been awarded to the Electric Auto-Lite Co., according to an announcement made here today.

Plant is Being Changed

MEMPHIS, Dec. 2—Work of installation of additional machinery started at the Ford Motor Co. Memphis plant Saturday. This will require several weeks. An addition of 350 to 375 men will follow. The inventory will be taken during this period.

Improved Road Figures Show Federal Aid Benefit

WASHINGTON, Dec. 2—Complete statistics for the United States for the calendar year 1928 covering all roads constructed by Federal, State, and local agencies, compiled by the Bureau of Public Roads of the U. S. Department of Agriculture, indicate that Federal-aid has helped materially in the construction of the higher types of surfacings.

In the year a total of 74,783 miles of highways were improved, says the bureau. With State and Federal funds and the cooperation of the U. S. Bureau of Public Roads, the States constructed 7814 miles of roads and 47 miles of bridges in the Federal-aid system. With State funds alone the States improved 21,391 miles of State roads, and the counties and other local units constructed 45,531 miles of county and local roads.

Foreign Output Announced

PHILADEPHIA, Dec. 2—The Budd Mfg. Co., of Philadelphia and Detroit, has announced the production figures of the Budd-built foreign body factories in which it is interested, or with which it is associated. Since the start of their foreign operations, the production of Budd all-steel bodies has been 282,700 divided as follows: 1925, 16,000; 1926, 36,500; 1927, 60,000; 1928, 82,000; first 9 mo., 1929, 87,500.

Chrysler Adopts Radio

DETROIT, Dec. 2—Walter P. Chrysler today announced the completion of plans for installation of radio receiving equipment in Chrysler cars. Designed and engineered as an integral part of the car itself, the installation will provide radio receiving facilities at the owner's option on closed models of the Chrysler "77" and "70" lines, it was said.

Engine Production Increased

HARTFORD, CONN., Dec. 2—In addition to bringing out the "Wasp Junior," announced yesterday, the Pratt & Whitney Aircraft Company will have manufactured approximately 200 "Wasp" and "Hornet" engines a month during the year 1929, as compared with 65 engines a month in 1928.

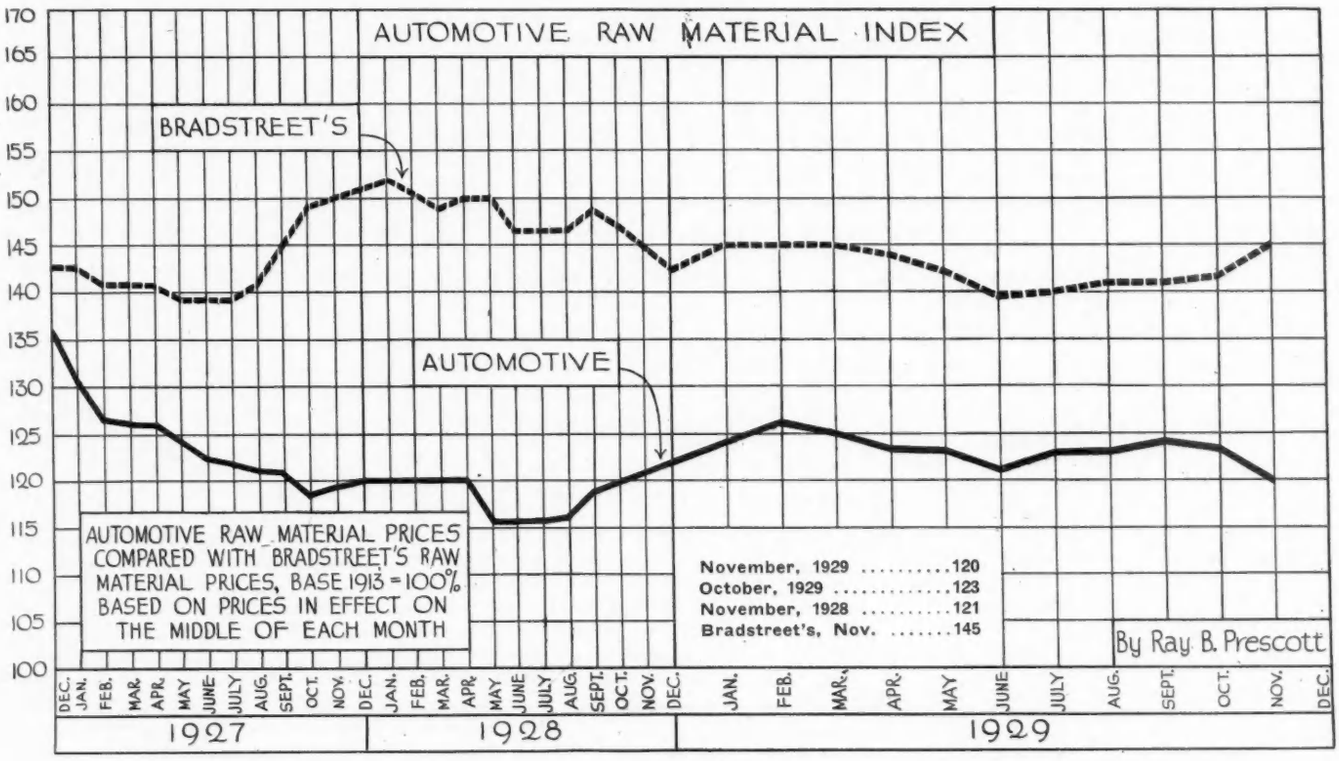
Grant Plans Building

MINNEAPOLIS, Dec. 3—The Grant Storage Battery Co. has acquired a block of land 200 by 300 ft. on which a new building to cost $100,000, will be ready by May, 1930. The company has branches in seven cities. Capacity will be doubled.

Trackson Buys Site

MILWAUKEE, Dec. 2—The Geo. H. Smith Steel Casting Co. and its subsidiary, the Trackson Co., have purchased a 21-acre site, preparatory to relocating the industry. The company is a charter member of the United Tractor & Equipment Corp.

Raw Material Index at Low Point for the Year



Glider Group Elects

DETROIT, Dec. 2—Officers of the National Glider Association were elected at a dinner meeting here last week in connection with the Glider Carnival. Edward S. Evans, president of the Detroit Aircraft Corp., was elected honorary president. William B. Mayo, chief engineer of the Ford Motor Co., was elected president. The other officers are Dr. Wolfgang Klemperer, chief research engineer of the Goodyear Zeppelin Corp., first vice-president; Dr. George W. Lewis, head of the National Advisory Committee for Aeronautics, second vice-president; Col. E. V. Rickenbacker, head of the Aviation Division of General Motors, secretary; Robert O. Lord, president of the Guardian Detroit Union Group, Inc., treasurer; D. F. Walker, manager.

China to Order Planes

PHILADELPHIA, Dec. 3—A squadron of 78 military airplanes, including 24 attack planes, 12 pursuit planes, 12 bombers, 18 training planes and 12 scout planes will be ordered from America by the Kwangtung Provincial Government, China, according to the current issue of the Chinese Economic Bulletin, which is published by the National Government of the Republic of China.

Marketing Handbook Issued

WASHINGTON, Dec. 4—Covering the general consumer, industrial and farm markets, the Department of Commerce has just issued a 535-page handbook of market data which is declared to have given marked impetus to the movement now under way in the United States looking to the elimination of waste in distribution. In the treatment of each market figures for the factors which determine the sales potentialities are presented, thereby permitting an accurate evaluation of each particular territory. The county was selected as the most satisfactory unit.

Body Works Closed

EVANSVILLE, IND., Dec. 2—The Graham-Paige Body Corp. factory, now closed for annual inventory, will resume operations Jan. 6 with a production schedule which promises a busy first quarter for 1930, according to J. W. Evans, factory manager. The early 1930 production program will necessitate employment of from 1000 to 1100 workers and will average 200 bodies a day, he stated. The milling departments will resume operation Dec. 23.

Factory Branch Established

DETROIT, Dec. 2 — Graham-Paige has established a factory branch in Grand Rapids to handle its wholesale and retail business in western Michigan. Albert E. Hall, who has been associated with the Graham brothers for eight years, is general manager.

Welding Conference Announced

LAFAYETTE, IND., Dec. 2—Purdue University announces its Fifth Annual Conference on Welding to be held at Lafayette, Ind., on Dec. 11, 12, 13, 1929. The three days will be devoted to lectures, demonstrations and exhibits of welding methods and equipment.

Michelin Altering Plant

NEW YORK, Dec. 2—The Michelin Tire Co. of Milltown, N. J., has begun expansion of its plant to incorporate recent and new developments which have been tried out successfully in the Michelin tire plants at Stoke-on Trent, England, and at Turin, Italy. The plans call for alteration of buildings and installation of new machinery which will eliminate hand labor to an extent never before accomplished, according to a statement by J. Hauvette-Michelin in announcing the expansion.

Swiss Motor Lines Gain

WASHINGTON, Dec. 2—From 1920 to 1928 the network of regularly organized automobile transport in Switzerland increased from 800 to 1200 km. per year, according to assistant trade commissioner, Kenneth M. Hill, Berne, in a report to the department of commerce. The number of passengers carried rose from 880,000 to more than 2,000,000, while the quantity of goods conveyed amounted to 49,000 tons in 1928, as compared with 16,000 tons in 1920.

Albert H. Vogel

COLUMBUS, Dec. 2 — Albert H. Vogel, aged 53, assistant superintendent of the Columbus branch of the Timken Roller Bearing Co., died suddenly Nov. 25. He was associated with the Timken company for 25 years and came to Columbus from Canton six years ago. He leaves his widow, mother and three daughters.

Automotive Plant Construction Gains

New Building Projects Continue to Show Increases Over Past Months

PHILADELPHIA, Dec. 5—Construction in the automotive field continues to show an increase over the preceding few weeks, in spite of considerable pessimism which has followed in the wake of the November stock market crash.

Reports of contemplated construction this week have verified numerous rumors, reported from every industrial section of the country, to the effect that many automobile, airplane and parts plants companies were contemplating expansion.

Among the reports received this week were:

Dornier Corp. of America, Inc. (General Motors), is considering $400,000 plant. Site has not been purchased.

Van Blerck Motors, Inc., Red Bank, N. J., is selling $300,000 stock issue, part of proceeds to be used for new plant and equipment.

Gilman Corp., Jersey City, N. J. (Charles M. Egan, attorney), plans 6-story service and repair garage to cost about $125,000.

Brandt-Warner Co., York, Pa., soon to ask bids on addition to automobile axle plant, project to cost about $50,000.

Stewart Motor Co., Buffalo, filed plans for $60,000 addition.

M. J. DeAngelis, Rochester, N. Y., architect, planning $100,000 service and repair garage.

Glenn L. Martin Co., Baltimore (airplanes), is arranging sale of note issue of $3,000,000, part of which will be used for additional manufacturing facilities.

St. Paul Garage Co., Baltimore, planning $1,000,000 service and repair garage. Wyatt & Nolting, architects.

Motor Car Ventilator Co., Suffolk, Va., planning construction of $20,000 foundry, for production of brass and aluminum castings.

A. B. Heaton, Washington, D. C., architect, has plans for $200,000 service and repair garage.

C. E. Freeman, Atlanta, Ford dealer, planning $100,000 service and repair building.

Chevrolet Motors Corp., Detroit, plans several units to cost $200,000 at Bay City, Mich., plant.

Fisher Body Corp., Detroit, plans $200,000 unit at Lansing plant.

St. Paul, Minn., City Council plans to take bids soon for $100,000 municipal airport units. Harry S. Bronson, City Hall, architect.

L. G. Hallberg, Chicago architect, planning $150,000 service and repair garage, at Evanston, Ill.

Cincinnati (Col. C. O. Sherril, City Manager) is considering $200,000 municipal automobile service and repair garage.

Auburn Automobile Co., Auburn, Ind., has awarded general contract to W. A. Sheets Construction Co., Fort Wayne, for two additions to cost $220,000 and $70,000. A. M. Strauss, Fort Wayne, architect.

Sidles Airways Corp., Havelock, Neb., plans hangar and machine shop to cost $100,000. Davis & Wilson, Lincoln, architects.

Willard Storage Battery Co., Cleveland, awarded general contract to Albert M. Higley Co., for $45,000 addition to manufacturing plant.

Curtiss Flying Service, Inc., New York, has awarded contract to J. F. Russell Corp., Louisville, for airport shops, etc., at Dalworth field, Dallas, Texas.

American Brown-Boveri Electric Corp., New York, is negotiating for plant near Dallas, Texas, to build dirigible aircraft and may include operation of dirigible-steamship passenger and freight service. Project will cost $15,000,000.

Hendrickson Adds Models

CHICAGO, Dec. 2—Three new models equipped with six-cylinder Buda engines have been added to the line of the Hendrickson Truck Co. They are Model ST-6, 2½-ton, $3,350; Model T-6, 3-ton, $3,800, and Model U-6, 4-ton, $4,900. The units of the two latter models are similar, including Zenith carburetor, Auto-Lite ignition, Fuller clutch, four-speed Fuller transmission, Ross steering gear and Timken rear axle, the former is bevel drive and the latter worm. The 4-ton model is equipped with a Brown-Lipe clutch, Brown-Lipe Model 60-7 dual transmission and worm drive rear axle. All three models are equipped with vacuum operated Lockheed hydraulic four-wheel brakes.

Crude Rubber Quiet

NEW YORK, Dec. 2—Arrivals of crude rubber continue to exceed the estimated consumption with the result that trading is weak and prices are approaching the lowest level since 1922, according to the F. R. Henderson Corp. Last week trading was exceedingly desultory and was further retarded by the presence of a holiday during the week. A considerable quantity of rubber was offered just above the market late Wednesday afternoon but failed to encourage much business. Stocks in London increased to 51,012 tons with Liverpool stocks slightly decreased, coming down to 17,479 tons.

du Pont Sells Duco Rights

WILMINGTON, DEL., Dec. 3—Patent rights for the manufacture of Duco lacquer in Germany have been sold by E. I. du Pont de Nemours and Co. to the Oberkoks Chemical Co., Berlin, according to a statement made here today by a representative of the du Pont company. The du Pont company will receive stock rights in the Oberkoks concern, and manufacturing in Germany will be centered at the factory of Oscar Moseback, a subsidiary of Oberkoks, in Riesa, Saxony. Similar arrangements will be made by the du Pont company in Italy, France, and Australia.

Production is Shifted

MILWAUKEE, Dec. 2—All production of the Wisconsin Malleable Iron Co., Milwaukee, which suffered a disastrous fire recently, has been transferred to the Lakeside Malleable Casting Co., Racine, Wis., an affiliated concern. It has not been determined if the Milwaukee plant will be rebuilt. The loss exceeded $150,000. The Lakeside is building several auxiliary structures to handle the added load.

Equipment Index Drops 26 Points

M. & E. A. October Figures Reflect Decreased Production Schedules

NEW YORK, Dec. 2—Marked reductions in automobile production schedules for the remainder of the year resulted in a material falling off in business done by original equipment manufacturers, according to October index figures announced by the Motor and Equipment Association. The original equipment index for October, taking January, 1925, as 100, is 160, as compared with 200 a year ago and with 186 in September of this year. Service parts also showed a falling off during the month with an index figure of 166, as compared with 184 for the corresponding month a year ago and with 173 in September of this year.

Accessories show an improvement as far as this year is concerned and established the same level as October last year at 91, as compared with 84 in September of this year. Service equipment is on a level with September at 147, as compared with 141 in September a year ago. This brings the grand index for the industry to 156, as compared with 188 last year and with 175 in September.

Wholesalers have shown an increase in volume of business handled, according to figures available at the headquarters of the M. & E. A., and have also shown a slight increase in accounts receivable. This increase has not been as great as in business handled, indicating an improved condition in collections.

Rubber Shipments Rise

NEW YORK, Dec. 2—Shipments of crude rubber from British Malaya will establish a new high record for the year, according to cable advices received this week by the Rubber Exchange of New York, Inc. Gross shipments during November were 49,000 tons, as compared with 47,900 tons in October and with 68,072 tons in November a year ago. Gross shipments for the 11 months ended Nov. 30 have reached a record figure of 531,410 tons.

Mercer Opens N. Y. Office

NEW YORK, Dec. 2—Mercer Motors Corp., recently incorporated in Delaware for the manufacture and sale of the Mercer car, has established headquarters in the Fisk Building, 250 West Fifty-seventh St., New York. Harry M. Wahl, is president.

To Build New Erskine

CHICAGO, Dec. 3—The Studebaker Corp. will start production this month on a larger and more powerful Erskine model, under $1,000 in price. First showing will take place at the New York Automobile Show, Jan. 4.

European Car Makers Discuss Uniform Tariff

PARIS, Nov. 16 — A second secret conclave of European motor manufacturers was held at the Laurent Restaurant, Champs Elysees, Paris, on Nov. 7 to discuss means and ways of admitting American automobiles into Europe on a contingent basis and of establishing a uniform European tariff against automotive products from the United States. A similar meeting was held in Paris on Oct. 11, just preceding the meeting of the Bureau Permanent des Constructeurs d'Automobiles.

Profound secrecy is maintained regarding the decisions, if any, arrived at during these meetings. It is known that this move was engineered from Germany, but delegates from every European country attended. An international grouping of automobile manufacturers exists in the Bureau Permanent, in which the N.A.C.C. holds membership. Although officials of the Bureau Permanent attended the secret meeting, the gathering was independent of that organization. John V. Lawrence, European representative of the N.A.C.C., states that he was not invited to the conclave and has no information concerning it.

Liquidation Being Completed

DETROIT, Dec. 2—Several thousand stockholders of the Durant Acceptance Corp. have already received checks for the full amount of their holdings as a result of the recent dissolution of the company. Hundreds of others are being mailed daily, according to Wallace Zwiener, vice-president, who is also comptroller of Durant Motors, Inc.

"The total number of stockholders was in excess of 6200," said Mr. Zwiener. "Every effort has been made to reach them with notices of the dissolution and requests to forward their stocks to the transfer agent, James Davidson, 250 West Fifty-seventh Street, New York. It is possible, however, that some of these notices miscarried, due to change of address, and in such cases all stockholders who desire their checks should immediately comply with the usual requirements."

November Output 214,400

NEW YORK, Dec. 4—Automobile production during November is estimated at 214,400 units, assuming the Ford production to be 100,000 units, according to figures announced by directors of the National Automobile Chamber of Commerce at their regular monthly meeting today. This makes the eleven months' production of 5,480,582 units for the entire industry and compares with 394,465 in October of this year and with 268,909 for November of last year. The eleven months' figure compares with 4,357,600 for the like period a year ago and with 4,600,000 for the entire year of 1928.

Canadian Exports Rise

OTTAWA, Dec. 2—In the 10 months of the current year ended October, exports of automobiles from the Dominion of Canada totaled 91,419, as compared with 64,317 in the corresponding period of last year. Imports for the period under review totaled 42,618 cars, as against 45,005 in the same period of 1928.

Fairmont Enters Canada

TORONTO, Dec. 2—Fairmont Railway Motors, Inc., with headquarters in Fairmont, Minn., has organized a Canadian company under Dominion charter to be known as Fairmont Railway Motors, Ltd., to manufacture its product in Canada. The new company will take over the Dodge plant in this city for the manufacture of its several products.

Secretary Hyde Reports Growth in Tractor Use

WASHINGTON, Dec. 7—An indication of the rapidly growing use of mechanical power on farms is the increase in the number of tractors manufactured in this country, it is pointed out by Secretary of Agriculture Arthur M. Hyde, in his annual report. In 1927 the number produced was 62,742. Though this was double the production of 1916, it was less than half the number turned out in 1928.

Tractors, it was stated, have recently been greatly improved in design and construction. The early farm tractors were large and proved unwieldy on land already under cultivation. Then followed a reaction toward very small tractors. Today, the report says, a middle course is followed. The tractors now turned out are somewhat larger than those that were popular a few years ago. In the northern Great Plains region the 3-plow and 4-plow tractor is coming rapidly into use, and there is some demand for 6-plow tractors.

Tax Revenue Increases

WASHINGTON, Dec. 2—Not counting refunds made, the total amount of the gasoline tax collected by 47 states and the District of Columbia in the first six months of 1929 amounted to $175,140,140, says the Bureau of Public Roads, U. S. Department of Agriculture, on the basis of figures reported to the bureau. In 1928 gasoline tax paid in the first six months of the year in 45 states, the District of Columbia, and in Illinois for one month of the period, was $140,635,398.

White Newark Branch Finished

NEWARK, N. J., Dec. 2—The White Co. has just completed a $120,000 branch here. The new building contains 55,000 sq. ft. of space and is equipped with complete service facilities. L. H. Magor is manager.

Calendar of Coming Events

SHOWS

Baltimore, Aircraft .....Dec. 9-14
New York National.....Jan. 4-11
East Orange, N. J., Automobile ...Jan. 8-11
Newark (N. J.) Automobile Show.Jan. 11-18
Philadelphia, Automobile .....Jan. 11-18
Buffalo, Automobile .....Jan. 11-18
Milwaukee Automobile Show ....Jan. 11-18
Toronto, Automobile .....Jan. 11-18
Cincinnati, Automobile .....Jan. 12-18
Boston, Automobile .....Jan. 18-25
Detroit, Automobile .....Jan. 18-25
Baltimore, Automobile .....Jan. 18-25
Harrisburg, Automobile .....Jan. 18-25
Louisville, Automobile .....Jan. 18-25
Hartford, Automobile .....Jan. 18-25
Pittsburgh, Pa., Automobile .....Jan. 18-25
Brooklyn, Automobile .....Jan. 18-25
Montreal, Automobile .....Jan. 18-25
Louisville, Automobile .....Jan. 18-25
Los Angeles, Automobile .....Jan. 18-26
Copenhagen Trucks, etc. ....Jan. 25-Feb. 2
Rochester, Automobile .....Jan. 20-25
Columbus, Automobile .....Jan. 26-Feb. 1
Portland, Me., Automobile...Jan. 27-Feb. 1
Wilkes-Barre, Automobile ...Jan. 27-Feb. 1
San Francisco, Cal., Automobile...Feb. 1-8
Minneapolis, Automobile .....Feb. 1-8
Toledo, Ohio, Automobile .....Feb. 3-8
Wichita, Automobile .....Feb. 3-8
Cumberland, Automobile .....Feb. 3-8
Syracuse, Automobile .....Feb. 3-8
Ottawa, Automobile .....Feb. 3-8
Peoria, Automobile .....Feb. 4-8
St. Louis, Automobile .....Feb. 4-9
Albany, Automobile .....Feb. 8-15
Akron, Automobile .....Feb. 8-15
Kansas City, Automobile .....Feb. 8-15
New York, American Legion, Aviation .....Feb. 9-15
Denver, Automobile .....Feb. 10-15
Indianapolis, Automobile .....Feb. 10-15
Sheboygan, Automobile .....Feb. 10-16
Mankato, Automobile .....Feb. 12-15
Providence, Automobile .....Feb. 14-22
Canton, Automobile .....Feb. 15-23
Copenhagen, Automobile .....Feb. 21
Camden, N. J., Automobile..Feb. 24-Mar. 1
Des Moines, Automobile ....Feb. 24-Mar. 1
Seattle, Wash., Automobile..Feb. 25-Mar. 2
Detroit (All-American Aircraft)..April 5-13
Boston Automobile Show.....Jan. 13-25
Chicago National, Coliseum..Jan. 25-Feb. 1
Cleveland Automobile Show..Jan. 25-Feb. 1

CONVENTIONS

Asbestos Brake Lining Assn., New York .....Dec. 11
Steel Founders Society Meeting, Pittsburgh .....Dec. 12
Highway Research Board, Ninth Annual Meeting, Washington, D. C. Dec. 12-13
National Automobile Dealers Association, New York City .....Jan. 6
American Road Bldrs. Assn., Atlantic City .....Jan. 11-18
Equipment for Motor Trucks, Inc., Atlantic City (during road show) Jan. 15
Ohio Assn. of Commercial Haulers, Cleveland .....Jan. 30-31
American Institute Electrical Engineers, New York .....Jan. 27-31
National Automotive Dealers Association, Chicago .....Jan. 27-28
Southwest Road Show and School, Wichita .....Feb. 25-28
American Society Mechanical Engineers, Fiftieth Anniversary Celebration:
New York .....April 5
Hoboken, N. J. .....April 7
Washington, D. C. .....April 8-9

S. A. E.

Annual Meeting, Detroit.....Jan. 21-24

SALONS

Hotel Biltmore, Los Angeles.....Feb. 8-15
Palace Hotel, San Francisco, Feb. 22-Mar. 1